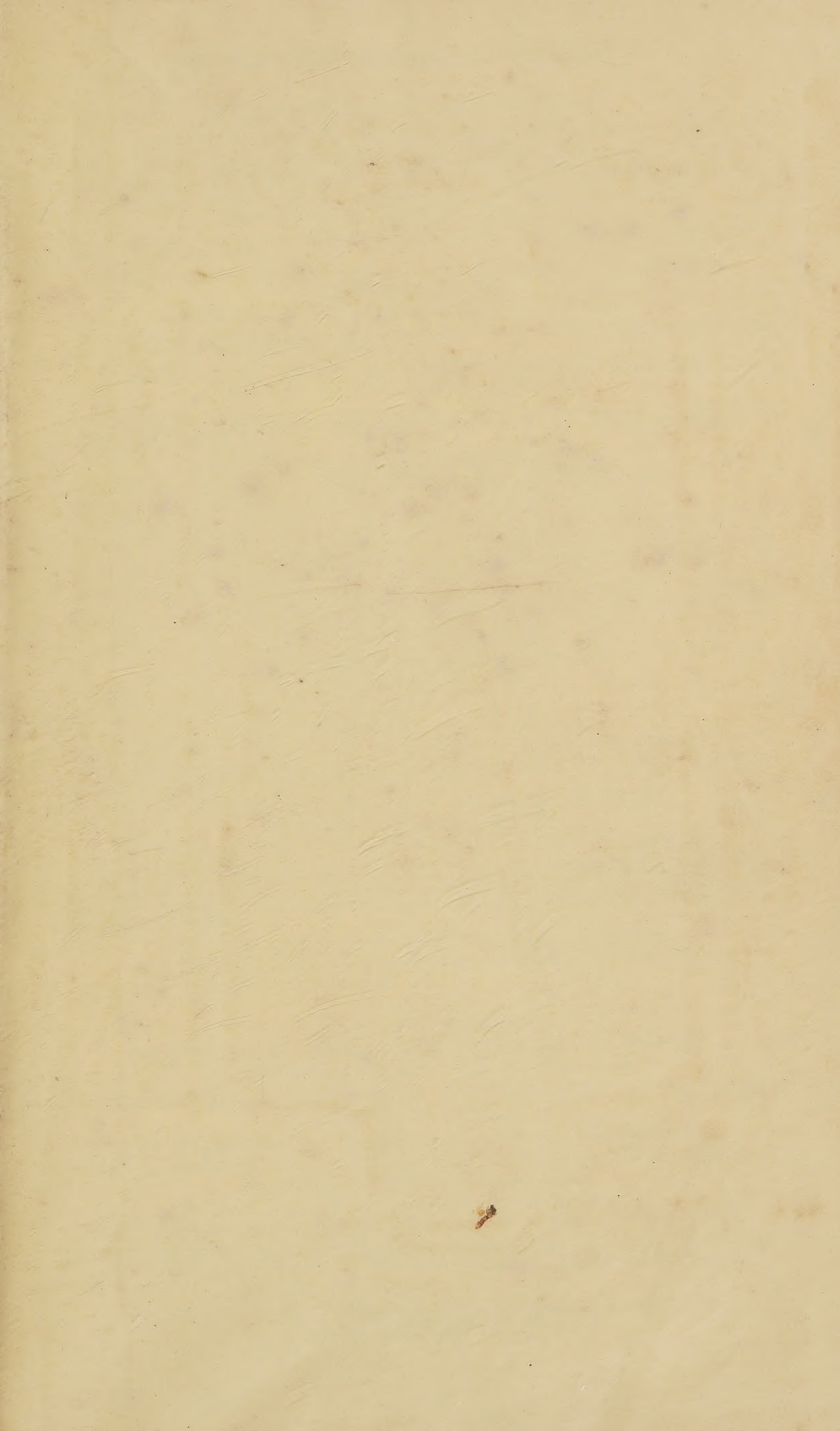


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ESSAYS, PAPERS, &c. PUBLISHED BY DR. RYAN.

1. An Essay on Mankind, and the apparent varieties of the Human Species; with an account of the effects of climate, situation, and civilization on mankind, and the physical characters of man in the parallel and different degrees of latitude. Read before the Royal Physical Society of Edinburgh, in 1820, and made the subject of an Inaugural Theses, entitled "De Genere Humano ejusque Varietatibus," 1821.
2. Clinical Reports on Aphonia, caused by fracture of the cranium, scirrhus of the tongue, diseases of the throat and windpipe.—*London Medical and Physical Journal*, 1823, v. 49. *Anderson's Quarterly Journal of Medical Science*, 1824.
3. On the Use of Hydrocyanic (Prussic) Acid in Pulmonary Consumption, Chronic Cough, Asthma, Diseases of the Heart and Stomach.—*London Medical and Physical Journal*, 1824, v. 51. *Medico-Chirurgical Review*, 1824.
4. Cases of Blindness, caused by Opacity of the Cornea, and Cataract, cured by Operations.—*Transactions of Dublin College of Physicians*, 1824, v. 4.
5. On the Chemical Composition and Medical Effects of all the known Mineral Waters in Europe.—*Medical and Physical Journal*, 1825, v. 54. Condensed in the *London Dispensatory* by Professor Thomson, 1830, and republished in Tegg's *London Encyclopedia*, 1828, No. 28—Art. Minerals.
6. Further Proof of the Efficacy of Hydrocyanic Acid, in extreme difficulty of Respiration.—*Transactions of Dublin College of Physicians*, 1828, v. 5. *Medico-Chirurgical Review*, and *Medical Gazette*, May 28.
7. On the Supply of Water to the Metropolis, with Proofs of its Impurities, and a Suggestion of a Remedy; with a concise account of the Natural, Chemical, and Medical History of Water, being a Guide to all known Mineral Waters. 1828.
8. Introductory Lecture to the Study of Midwifery; with a concise Account of the History of that Branch of Medicine.—*Lancet*, 1828.
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43. An Introductory Lecture to the Study of Materia Medica and on the Classification of Medicines. Delivered before the Medico-Botanical Society of London, 1832.
44. Arguments and Facts against the Contagiousness of Blue Cholera in 1831, which were quoted by the public press, and first contributed to overthrow the baneful doctrine of Contagion; *London Medical and Surgical Journal* from February to November, 1832. All the other British Medical Journals were in favour of Contagion.
45. Essay on the Pulse and its Modifications. *Op. cit.* 1832.
46. On the Immediate Relief of Toothache in cases of Caries, by the Application of pure Nitric Acid. *Op. cit.* 1832.
47. Lecture on the Preparations of Iodine, and defence of the value of that Medicine. *Op. cit.* 1833.
48. A Course of Sixty Lectures on the Physical Management and Diseases of Infants, from Birth to Puberty.—*London Medical and Surgical Journal*, &c. 1833.
49. A Course of Lectures on Midwifery and Diseases of Women and Children. *Op. cit.* 1835.
50. Essays on Diseases of the Heart and Lungs, with the views of his relatives, Dr. O'Ryan, on "Consumption." Dr. Ryan on "Asthma" and "Consumption," and with the conclusions of recent authors. *Op. cit.* 1836.

A
MANUAL OF MIDWIFERY,

AND

DISEASES OF WOMEN AND CHILDREN,

WITH

A COMPLETE ATLAS,

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OPERATIONS; AND BEING

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FOURTH EDITION,

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BY M. RYAN, M.D.,

MEMBER OF THE ROYAL COLLEGES OF PHYSICIANS AND SURGEONS OF LONDON; MEMBER OF THE
ASSOCIATION OF FELLOWS AND LICENTIATES OF THE ROYAL COLLEGE OF PHYSICIANS OF
DUBLIN; M.D. OF THE UNIVERSITY, AND MEMBER OF THE ROYAL COLLEGE OF
SURGEONS OF EDINBURGH; PROFESSOR OF MEDICINE AND MIDWIFERY;
PHYSICIAN TO THE METROPOLITAN FREE HOSPITAL, ETC. ETC. ETC.

Περὶ δὲ τῆς γυναικείας φύσεως καὶ νοσημάτων τὰ δὲ λέγω.

ΙΙΙΙ.

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MANUAL OF MIDWIFERY.

INTRODUCTORY REMARKS.

THE science of Obstetricy has, perhaps, more rapidly advanced than any other branch of medicine. It is now reduced to fixed principles, and may be defined, "all human knowledge relative to the reproduction of the species." This definition necessarily embraces not only what is designated Midwifery in the common acceptation of the term, but also the physiology of generation in the animal and vegetable kingdoms, which is now deemed closely analogous, if not identical. The perpetuation of the human species is well illustrated by the universal code of generation of organized beings. I have given an epitome of this code in the succeeding pages. We must, however, chiefly confine ourselves to the physiology and pathology of reproduction, to the use and abuse of the organs subservient to it—to marriage and venereal abuses, which I have described in separate works. I have considered it right to describe the PHILOSOPHY OF MARRIAGE in its social, moral, religious, and medical relations, as well as venereal excesses and abuses, as injurious to the continuance of the species; unconnected with my original work on Midwifery—a separation in accordance with the views of the present age in all countries. (See PROSTITUTION IN LONDON; with a Comparative View of that in Paris and New York, &c., and an Account of the Nature and Treatment of the various Diseases caused by the Abuses of the Reproductive Function, 1839. See also DISEASES OF THE GENITO-URINARY ORGANS.)

It must, I conceive, be admitted by every rational individual arrived at the adult age, that the study of the physiology and pathology of the sexual organs, is as inseparable as those of any other in the human body; whatever may be the narrow-minded and unsound views of those, who content themselves with only studying, what is technically termed by the modern professors of the healing art, Midwifery and Diseases of Women and Children; meaning, thereby, the aid afforded during parturition, together with a very superficial account, of the nature and treatment of the diseases of women and children. This, however, is but a very small part of the universal code of generation of plants and animals.

In accordance with the regulations of our corporate bodies as regard medical education, I not only adopt the contracted view of the science and practice of Midwifery, such as is taught in our schools; but, at the same time, I consider my subjects much more minutely than has been hitherto done in this country, and I leave no part without illustra-

tion. I have delineated the anatomy of the pelvic organs, the physiology, including ovology and embryology; the different periods of pregnancy, most minutely, indeed more so than I have ever seen, the different steps in the mechanism of parturition, as well as every obstetric operation practised in these kingdoms.

I have likewise to state, that much reflection on the barbarous terms in use, led me to the proposal of others which I consider more correct and classical, and these have been approved of by the most eminent obstetric professors and authors, both at home and abroad. Thus, in my opinion, Andro-geneseology, generation of the human species; Gynæcology, Gynæconosology, the physiology and diseases of women; and Pædology and Pædonosology, the physiology and diseases of children, are much more comprehensive and correct terms, than midwifery and diseases of women and children. The subdivisions of Andro-geneseology, the proper term for Midwifery, I took the liberty of designating as follows, in 1828:—Gynæcotomy, Gynæcophysiology, Parthenosology (diseases of virgin and unimpregnated women), Andro-geneseology, on generation, conception; Encyonosology, diseases of pregnancy; Tocology, parturition; Lochianosology, diseases of childbed women; and Pædonosology, diseases of infants. These terms were approved of by national and foreign contemporaries, and especially by M. Martinet, as will appear hereafter.

“ M. Ryan vient de faire en Angleterre pour les accouchemens, ce que M. Le Professeur Duges et M. Tarvenier avaient fait en France, pour la même branche de l’art et pour la chirurgie.

“ Ce Professeur pour supplier à quelques lacunes qui existaient dans les ouvrages du même genres publiés avant le sien, s’est attaché à faire connaître les maladies des organes de la génération, celles qui se développent pendant la grossesse, après l’accouchement, et enfin les affections propres à l’enfant nouveau né.

“ Aux mots généralement usités, M. Ryan a cru devoir substituer des expressions nouvelles, telles que gynæcologie, gynæcotomie, gynæcophysologie, parthenosologie, tokologie, &c. &c., qui forment, autant de chapitres dans les quels il examine à fond toutes les questions qui s’y rapportent. Le Manuel d’Accouchement de M. Ryan est un livre destiné à devenir classique, aussi croyons nous devoir le recommander aux étudiants de Paris et de Montpellier, qui veulent être au courant des progrès de cette partie de la chirurgie chez nos confrères d’outre mer.”—*Dr. Martinet, Revue Medicale Française Etrangère, Feb. 1830.*

“ M. Ryan has done for Midwifery in England what Professor Duges and M. Tarvenier have done in France for this branch of surgery. This professor has filled up the lacunæ which existed in the works of preceding authors, and has described the diseases of the organs of generation, those which occur during pregnancy, after delivery, and, in fine, the affections peculiar to newly born infants.

“ M. Ryan has substituted new expressions for the terms generally used, such as gynæcology, gynæcotomy, &c, which form chapters, in which he profoundly examines all questions relating to them. The Manual of Midwifery of M. Ryan, is a work destined to become classical (a standard one), and we recommend it as such to the students of Paris

and Montpellier who wish to keep pace with the progress of this branch of surgery with our contemporaries at the other side of the Channel."

Many similar and equally favourable reviews, both national and foreign, have appeared of the work, as will be noticed hereafter. I also proposed in it another new term, prefaced by the following words: "As there is no exact term in the English language for the male practitioner of Midwifery, except the French word *accoucheur*, I propose the word *obstetrician*, which is as appropriate as *electrician*, *geometrician*, &c."—*Manual*, 1828, p. 4. This term was at once adopted by Dr. Blundell. (See Lectures in *Lancet*, 1828), and is now in general use. I was led to the coinage of this word after a great deal of research, but particularly as I found that Pliny had designated Midwifery, *obstetricium*. It must be evident to any classical scholar, that had there been a male attendant (*obstetrician*) in his day, he would have been called *obstetricius*; a word not in any dictionary which I have had as yet the opportunity of consulting, but which would be rendered in our language, *obstetrician*. Having so far succeeded, as I conceived, I was naturally anxious to supersede, if possible, the barbarous and unclassical term, *Midwifery*, as I had already done that of *man-midwife*, *mid-men*, *mid-woman*, *midwifer*.

I have already remarked, that the classic writers had termed Midwifery, *obstetricium*, *ars obstetrica*, *ars obstetriciæ*: the correct English version of the last words being, in my opinion, *art of obstetrics*; or, if the reader please, *science and art of obstetrics*. I therefore unhesitatingly proposed the term *Obstetrics*, as a substitute for that of *Midwifery*; and this was immediately adopted by the late Dr. Castle, in his edition of Dr. Blundell's *Obstetrics*, and also by the distinguished author of that work, published in 1834. I am particular as to dates, because they will clearly prove the priority of claim of the respective innovators on barbarous obstetric phraseology. Some may consider this a point of very little importance; while others may entertain a very different opinion. Be that as it may, it is only right to give every one his due; and dates set all rival claims at rest.

I may here be permitted to observe, that the present is the age for improvement in the arts and sciences, and most persons are wont to adopt such innovations. Feeling deeply sensitive about our medical nomenclature, I have endeavoured to improve it. This may be one of my hobbies, but it is a good one. In my preface to the second edition of the *Manual of Midwifery*, 1829, I have stated, "He (the author) has perceived with much pleasure, that some of the brightest ornaments of the profession have already sanctioned his terminology, (proposed in 1828). Thus, Dr. Blundell has approved of the term *obstetrician*, which the writer proposed as a substitute for the anglicised French word *accoucheur*, as well as for the barbarous term *man-midwife*, that even as yet adorns so many portals in this intellectual city, and is still appended to the titles of some respectable officers of our obstetric institutions."

Professor Velpeau of Paris, has also preferred the word *obstetrics* (*obstetricie*) to *obstetrique*, as well as adopted the terms *embryology* and *tokology*. The German writers have acted in a similar manner. But I was not aware, until the third edition of M. Velpeau's learned work

appeared, 1835, that he had proposed the term *Obstetricie* so early as 1823, and employed it in his Inaugural Dissertation, published at Heidelberg, in 1830; but I could not possibly be cognizant of the fact in 1828, two years before his publication had appeared.

The very favourable reception of the first edition of my work soon after its publication, by the most eminent obstetric professors of this and other countries, stimulated me to improve its future editions. Professor Hamilton of Edinburgh, one of the greatest obstetric authorities now living, not only approved of the production, but allowed me to inscribe it to him, "as a grateful acknowledgment of the practical information" which I derived from his valuable lectures; and the learned and experienced professor has since done me the additional honour, as I have been repeatedly informed, of making favourable mention of my humble production in his lectures.

Professor Burns of Glasgow, the justly celebrated author of one of our best systematic works on obstetric medicine, also favoured me with his opinion in the following words:—"Your Manual appears to me to contain a great deal of most useful information, in a very concentrated form. I have no doubt but that it must prove useful to all the profession, more especially to the younger part, who from its size can carry it along with them, and consult it when they wish to refresh their memory on any point on which they have any doubt." Dr. Blundell also expressed his opinion in these words:—"The compressed yet copious Manual with which I have been favoured, I read with much pleasure and instruction," quoted in *Obstetricy*, 1834, *passim*. Dr. Conquest has spoken of it as follows:—"I have read most parts of the Manual you so politely sent me, with very great satisfaction. I think it displays great research and judgment; and although I do not concur with you in every statement, I am convinced the publication cannot fail to give currency to principles and practice, such as every man of science must desire to see universally adopted." Professor Samuel Cooper declared the work replete with useful matter. (*Good's Study of Med.* v. 5, p. 115,) *Surgical Dictionary*, pp. 143, 157, &c. 1830—1838. Dr. James Johnson, the editor of the *Medico-Chir. Review*, said, "that it evinces considerable research, discrimination, acuteness of observation and talent." No. for April 1829. The former editor of the *London Med. and Surg. Journal* observed, "this work will contribute in a high degree to maintain the respectability and importance of Midwifery. It contains, according to its size, more useful information on the subject, than any work with which we are acquainted. Instead of spreading out the subject into an extensive systematic treatise, the author has drawn together all the facts both in ancient and modern writings, and has condensed them into 353 duodecimo pages. [The last edition extended to 737 pages.] Every page of it is full of information highly interesting to the practitioner, and we feel satisfied that it will be appreciated by every scientific member of the profession." No. for Dec. 1828. "This work contains a great deal of information."—*London Medical Gazette*, Nov 8th, 1828. "It contains three times more matter, according to its size, than any one we have seen." *Op. cit.*, 1832.

Professor Dewees of Philadelphia, the most celebrated obstetrician in the new world, thus spoke of the work:—

“ This ample title page pretty fully explains the nature and arrangement of the work under notice; but it, at the same time, excites our surprise, that so many subjects can, with any degree of success, be treated of in a 12mo. of 353 pages. [Last edition 737 pages.] Though we have an utter abhorrence at all ‘royal roads’ to practical midwifery and its relations, as explained in the title page of this work, we are, nevertheless, bound to confess, that the author has redeemed his promise with more success than has been done in any work we have yet seen, which purported to be a ‘manual.’ The author appears to have been laborious in research; and to possess the happy art of condensing the sense of his authorities, without destroying the spirit of their meaning. He appears truly, (as he declares it was his intention,) ‘to compress in a small compass, all the valuable matter connected with the anatomy, pathology, and therapeutics of the organs peculiar to females,’ and to have furnished his reader with the opinions of many authors that cannot be consulted in this country. This culling is acceptable to all readers; and is particularly valuable to those who may be desirous of consulting the literature, upon the various subjects of which he treats. He rarely fails to instruct by his erudition; and as seldom misleads by his practical precepts, or his therapeutical views; he appears to be well qualified to choose from the many sources to which he has resorted; as he manifests a tact for selecting, which can only be derived from both experience and correct reasoning. In a word, it is a work that we can confidently recommend, not only as safe to follow, so far as his directions go, but as one from which the experienced and well-instructed practitioner may find considerable information; and under these impressions we do most cordially recommend its perusal to the American public.”—*American Journal of the Medical Sciences, Philadelphia, Feb. 1830.*—*Professor Dewees.*

“ Gooch, Ryan, Ashwell, Davis, in England; Dewees, in America; Boivin, Duges, Maygrier, Velpeau, Capuron, in France, have each in turn done credit to their own talents and learning, and a service to mankind by their industry.”—*North American Medical and Surgical Journal, Philadelphia, July, 1830.*

Professor Velpeau, one of the most talented, learned, and zealous surgeons of France, has in his third edition, 1835, after a most elaborate and impartial criticism on the works of ancient and modern obstetricians of all nations, thus observed:—

“ M. Ryan a rassemblé, dans un manuel fort bien résumé, ce qu’on possède de mieux sur la tocologie.”

“ M. Ryan has collected, in an exceedingly well condensed manual, all that is important on tocology.”

In addition to these high encomiums, it has been my good fortune to have subsequently received others from the heads of the profession in this great metropolis, including the court, collegiate, corporate, naval, military, and hospital functionaries, not only on my qualifications as a writer and lecturer on obstetrics, but also on the principles and practice of medicine and medical jurisprudence. The truth of this statement is well known to the leading members of the profession, as well as to the conductors of the medical and public press in this metropolis.

I have also received similar testimonials from the most distinguished

members of the medical profession, not only in the British dominions, but in continental Europe, America, and India; ample proofs of which have been given me by the faculty, as well as the medical and public press in the countries which I have enumerated, while I was, for several years, Editor of the London Medical and Surgical Journal.

The only claims I had in my favour, were industry, research, observation, some experience, and having treated all authors from whom I quoted with perfect impartiality, justice, and independence. Indeed, I may fairly use the language of my learned and celebrated contemporary, M. Velpeau, on a similar occasion, in his preface:—

“I have not been unjust to any one. I spoke of, and quoted all, without prejudice, with freedom, and with complete independence. I considered the medical sciences a republic, in which every one was at liberty to search, examine, and to entertain his own opinions; and to say what he thinks. Truth is the avowed object of all who cultivate these sciences; but as we may arrive at it in a hundred different ways, I never could understand, that a rational man could be offended because others differed from him in opinion.”— (*Op. Cit.*)

I should not have inserted the various commendations of the Manual of Obstetricy, were I not convinced that the present edition is greatly enlarged, improved, and revised; and also to shew the reader the judgments of the heads of the profession.

I venture to assert, that notwithstanding the numerous elementary and systematic obstetric works now extant, there is not any thing like a complete illustration, by engravings, of this branch of surgery in any country. If there be, I have not been as yet so fortunate as to find it, although my researches were not the most limited. Indeed, every attempt hitherto made in this kingdom, from the time of Dr. W. Hunter to the present, to produce any thing like a correct delineation of obstetric medicine has been unsuccessful; and even the engravings, published in continental Europe and America, are as yet imperfect. I have examined and selected from all standard works, and added many original drawings with a view of supplying this great want in medical literature. I have been engaged on the work for several years past, and have illustrated all the capital operations in a similar manner to the plan of Mr. Liston, in his truly valuable work on Practical Surgery. The drawings were kindly made for me by my former and zealous pupil, Dr. Hills; and the engravings are not only anatomically and surgically correct, but very finely drawn by the artist, Mr. Swinford, whose name is attached to each of the plates.

Here I must, in justice to my professional reputation, observe, that the plates formerly executed for me by Henderson, of the Old Bailey, some of which appeared in the London Medical and Surgical Journal, edited by me, were not revised or corrected by me before publication, contrary to our agreement, and are unfinished, inaccurate, badly executed, and only calculated, for the most part, to mislead the student. I have therefore had the drawings re-engraved, to ensure correctness, and I have introduced several figures not in the former impression. The booksellers and the purchasers will please to bear in mind, that Mr. Balliere, of Regent Street, is the publisher, and Mr. Swinford, of Queen's Place, Great Queen Street, Lincoln's Inn Fields, the engraver,

or lithographer, of the present and only correct edition of my *Obstetric Atlas*.

The descriptive letter-press gives a summary of the actual state of *Obstetric Medicine*, which I venture to hope will be acknowledged by every scientific medical practitioner. It will also appear that my arrangement is somewhat different from those adopted in other *standard* works; but in my opinion, it is more in accordance with anatomy, physiology, and pathology.

The account of the treatment of female complaints in the unimpregnated, pregnant, and puerperal conditions, is not so minute as formerly, because it is based upon ordinary principles, and now well known to every modern and educated obstetrician. Inflammation, or its consequences,—irritation, neuralgia, spasm, pains, and all unnatural sensations, are now very properly treated upon the same diversified principles, whatever may be the organ affected.

Nevertheless, I have deemed it necessary, more in accordance with the arrangements of standard obstetric works, to give a summary of the nature and treatment of the diseases of women in the unimpregnated state, during pregnancy, and childbed: not forgetting the hygiology—physical and medical management of infants and children. The reader is also reminded of many civil and legal cases, on which he will be called to give his evidence, and on which he will find full information in some of the modern standard works on *Medical Jurisprudence*.

I have likewise greatly improved, I think, on the former editions of this work; and have certainly used every possible means to render the present atlas a standard production, and a truly practical manual. I have, in a great measure, avoided quoting authorities, unless as seldom as possible, because I know as a public teacher, of some year's standing, that students and junior practitioners are only anxious to acquire the fullest practical information, in the smallest possible space. Moreover, it will be allowed that reference for authorities should be made to systematic and not to elementary works, for an account of the use and progress of any art or science. But in my own justification in this work I may state, that the last edition of my *Manual* has been quoted for authorities, and my own opinions, no less than seventy times in the work of one of our most distinguished obstetric professors. I am still, however, aware that the majority of modern students and junior practitioners care very little about ancient writers, and are only desirous of obtaining that portion of information, which will avail them at the examiner's board, and the bed-side; there are, however, some few exceptions.

In preparing the following pages, I have referred to the best modern and most of the ancient standard authorities. I have selected from all. I have laid under contribution not only the works of my contemporaries, which I could procure, but also of the profession at home and abroad, in ancient and modern times. I have likewise added the result of my own observation and experience, as a student at, or officer to dispensaries and hospitals since 1815 to the present period, as well as the results of my private practice. I have differed from the classifications of others, as I considered that which I have adopted more in accordance with the modern science. The profession will decide whether it is good or bad.

But of this I am certain, that it is, in my opinion, best suited to medical students and junior practitioners, for whom this work is chiefly intended.

I shall now conclude by briefly recapitulating what I consider to be the improvements in the following pages.—The first edition was an outline of the heads of my lectures, which I was requested to publish in 1828. Of the manner in which that impression was received in this and other nations, the reader is already acquainted. The next edition was in 1829, and the third in 1831; since which period, circumstances, over which I have had no control, have prevented its reappearance until the present time; but the interval has enabled me to recast, modify, rewrite, and enlarge the whole, and bring it down to the actual state of science at present.

The article on the osteology of the pelvis is entirely rewritten, enlarged, and improved, and the diameters, axes, and planes of this part, with the mechanism of natural parturition, very fully described, and very beautifully illustrated.

The soft parts are also accurately delineated. The physiology of menstruation, generation, ovology, the gravid uterus, foetal and placental functions, as well as the signs of pregnancy and the several stages of parturition, are revised, enlarged, and graphically illustrated, together with every obstetric operation sanctioned and performed in this empire.

I have, however, deemed it right not to illustrate by engravings some few obstetric operations, which never have been, and most probably, never will be performed in the British dominions. The objections to these I shall fully consider under their respective heads. Were every obstetric operation on record to be illustrated in the following pages, the student would be confounded, and the chief object of this work, which is an elementary one, would, in a great degree, be frustrated.

It is for this reason that I have purposely omitted the description of extremely rare cases, which may not occur during the whole life of an ordinary practitioner, all of which will be found in the standard systematic works on Obstetrics. My sole object is, to delineate obstetric surgery as it is now daily practised, well knowing that every regularly educated member of the profession must be fully competent to manage anomalous cases, according to the established principles of modern medicine and surgery; or after reference to modern systematic treatises.

I have now only to add in conclusion, that this work will appear in ten monthly parts, each containing thirty-two octavo pages of descriptive text, with four beautifully executed plates, principally from original drawings, and averaging twelve figures in each number, enclosed in a wrapper, at an unusually low expense.

The first number will appear at the commencement of the Medical Session, Oct. 1, 1839, and be continued every month, until the whole will be completed. There can be no disappointment as to the regular issue, as the whole of the plates, and the greater part of the letter-press, are already executed.

4, *Charlotte Street, Bloomsbury, Bedford Square,*
Oct. 1, 1839.

CHAPTER I.

GYNÆCOTOMY, OSTEOLOGY, SEXUAL ORGANS.

THE pelvis, or assemblage of bones, through which an infant passes into the world, presents natural and morbid states, which must be carefully studied by the obstetrician and medical practitioner.

Gynæcotomy comprehends five principal divisions:—1. the pelvis, and its annexions; 2. the uterus; 3. the internal appendages of the uterus; 4. the external appendages, or organs; 5. the mammæ, or breasts.

Of the Pelvis or Basin.—The obstetric properties of the pelvis can only be learned on that of a well-formed adult woman, that is, of one eighteen or twenty years of age, which is that period of life, in temperate climates, at which she is capable of becoming a mother, with perfect safety to herself and to her infant. At an earlier age, the pelvis is not sufficiently strong or developed, to bear the burthen of pregnancy or force of parturition; and, at a later age, the bones which form this canal, are too firmly articulated, and their ligaments too rigid and strong, to allow the commodious and easy passage of the infant. At both of these extreme ages, women purchase the pleasures of maternity at a very dear rate, generally at the risk of their own and their infants' lives. We therefore describe a pelvis at the adult age, as a standard or natural one.

The pelvis may be normal or natural, or abnormal or unnatural, small, large, or deformed. It must be studied without any of the soft parts that cover it, or of the organs which it contains; and afterwards in relation to the latter. The old anatomists first described the pelvis as a part of the trunk and the bones which form it, (Diembroeck, Dionis, St. Hilaire, Mauriceau, De la Motte), a plan which is now universally adopted. It is not enough to study its anatomical but also its obstetrical peculiarities; and this has been done by the most eminent obstetricians, (Deventer, Levret, Smellie, &c. &c.), as well as by all their distinguished successors to the present time. Modern obstetricians in general confine their description to those parts of the pelvis concerned in parturition. They properly consign the minute descriptive anatomy to the professors of that branch of science.

Of the Bones which compose the Pelvis.—The pelvis or basin, in the adult human female, is situated below the vertebral column or spine, which it supports, and above the inferior extremities, which support it (*plate I, fig. 1*). It is a bony canal, which forms the lower part of the abdominal cavity, contains that portion of the intestinal tube called the rectum, or lower intestine, and also the bladder and internal organs of generation. It is said to be the centre of gravity of the body, and affords a passage to the principal emunctories which convey the excretions of digestion, the urinary and uterine secretions, and various morbid growths, both fluid and solid. It is also subservient to the process of generation, the progress of the infant during parturition, and the puerperal evacuation. It likewise contains and protects the impregnated uterus, and forms the acetabula, cotyloid cavities or sockets for the thigh

bones. In consequence of its subserviency to so many important offices, it is necessary that it should be permanently fixed and immoveable, but more especially on account of the great force applied to its parietes by the mechanism of natural parturition.

The direction of the pelvis will vary according to the different attitudes of the body; it is oblique superiorly and inferiorly, and anteriorly and posteriorly; and becomes nearly vertical and horizontal, according as the woman assumes the sitting or recumbent posture. The obstetrician must study this part distinct from the rest of the body, as one intimately concerned with his art—as the book of nature, which must be always consulted, and which affords the best precepts for practice. He should therefore know its peculiarities—its regions, dimensions, directions, planes, axes, structure, connexions, and varieties. The knowledge of all these is indispensable to the obstetrician who wishes to practise dexterously the operations relative to his art, as it would be extremely difficult, if not impossible for him, to pass the hand or an instrument to extract the infant, without knowing the direction he was to introduce and withdraw it. Deprived of this knowledge, one might practise obstetrics for thirty or forty years, and be a most ignorant, inexperienced, and injudicious obstetrician (Dewees). Such a practitioner could not perform a manual or instrumental operation with safety; and yet how many thousands of such ignorant individuals are now in practice in this and other countries!

The pelvis of the adult human female is composed of four bones, the *sacrum* and *coccyx* posteriorly, or on the median line, and the two *ossa innominata, vel coxalia*, on each side and anteriorly.

The *ossa innominata* are composed of three bones on each side in the foetus, *os ilium*, *os ischium*, and *os pubis*, the “hip or haunch,” “the sitting,” and “front or share-bones.” These terms are used by nurses, and enable us to understand their descriptions and meaning; and these bones are described separately by anatomists and obstetricians.

The *sacrum* is the most posterior bone of the pelvis, is situated between the last lumbar vertebra and the coccyx, and is wedged between the *ossa ilia*, haunch or hip bones, on each side (*plate 1, fig. 1, bb*). It was called sacred bone, on account of its triangular form, of having been offered as a sacrifice by the ancients, and from its supporting the genital organs, which were named sacred by the older anatomists; it is termed “rump bone” by nurses. It resembles a triangular pyramid reversed, having its base, superiorly, attached to the last lumbar vertebra (*k*), and from its union anteriorly a projection is formed, called the *sacro-vertebral point or angle*, and in ancient obstetric language, the *promontory of the sacrum* (*j*).

The anterior, internal, or pelvic surface of the sacrum, is more or less concave, and presents four or five quadrangular spaces with transverse lines, and five foramina or holes on each side near the central line of the bone, converging inferiorly, and destined for the passage of the anterior crural nerves (*iii, iii*). These nerves are sometimes pressed on by the foetal head, when large and the pelvis small, and the result is cramp in the limb on the affected side, which is often a painful though transient symptom during labour, and will be particularly described

hereafter. There are small projections between each row of foramina or holes, for the attachment of the muscles. The concave surface of this bone is called, in obstetric phraseology, the *concavity or hollow of the sacrum* (*m m*). There are also to be seen two rows of foramina posteriorly, for the passage of the branches of the posterior sacral nerves. There are likewise two other small triangular spaces, which terminate the spinal canal of this bone. There are also eminences to afford attachment to the posterior sacro-iliac ligaments. The sides of the sacrum are articulated with the coxal, iliac, or nameless bones, and the union is called the *sacro-iliac junction*, or *symphysis*, or *synchondrosis* (*plate 1, fig. 1, c c*). This bone is so firmly wedged between the ossa ilia, or hip bones, on each side, and so strongly united to them, that it supports the weight of the body without yielding. Inferiorly, the sacrum gives insertion to the large and small sacro-sciatic ligaments (*ll*). The summit, or apex of the sacrum, is elliptic and a little convex, presenting a cartilaginous surface for the union with the coccyx (*plate 1, fig. 3, c c*). The sacrum has been considered by some as a simple prolongation of the spine, and is formed before birth by five pieces of bone, somewhat similar to vertebræ, and hence called false vertebræ (by Winslow, &c.) In most cases we can readily observe as many points of prominent ossification. The breadth of the base or superior margin of this bone is four inches, that of its apex or inferior part two inches; and its length from the base to the apex is generally about four inches and a half.

The *coccyx*, so called from the resemblance to the beak of a cuckoo, is termed “crupper” or “huckle-bone,” is considered by many an appendix to the sacrum, and is of a pyramidal or triangular shape; its base being articulated to the apex of the sacrum, and its apex affording insertion to the sphincter ani. It is composed of three or four pieces at birth, which are united to each other by cartilage, and in most adult subjects are not perfectly ossified, and hence admit of a regressive motion during parturition. Such motion is denied altogether by many eminent professors.

M. Velpeau asserts, and I entirely agree with him in opinion, that the coccyx can move on the sacrum in most women until a late period in life, although Dr. Denman, Dr. Hamilton, and others, assert the contrary.

The anterior aspect of this bone is concave, and supports the extremity of the rectum; while its posterior surface is convex and rough, and is separated from the integuments by the posterior sacro-coccygeal ligament only. Its sides afford attachment to the sciatic ligaments, coccygei muscles, sphincter, and levator ani.

Dr. Denman heard the noise made by the fracture of this bone and its separation from the sacrum; inflammation supervened, and it was finally expelled. I have met with some cases of this kind, and others caused by external injury. I once attended two cases in the same family together; one was caused by parturition, the other by a contusion.

The coccyx may be pushed outwards to the extent of an inch during parturition, as every obstetrician of moderate experience and practice can attest; or it may be entirely separated from the sacrum.

Deventer was aware of this fact, and was accustomed to pass his hand

into the vagina to push back the coccyx,—an operation which is very seldom if ever necessary during labour, and never performed by modern obstetricians. Sennert was of opinion that the great rigidity or ankylosis of the sacro-coccygeal joint caused the death of the mother and infant. (*Opera*, lib. iv.) Amand was more correct when he stated that this rigidity produced excruciating pain about the anus and “lowest bone of the back,” in some women, after delivery. (*Nouv. Obs.*, &c.) When the coccyx is ankylosed, or ossified to the sacrum, in its normal position, or at oblique or right angles with the sacrum, Mauriceau (*Obs. sur les Malad. des Femmes*), and Peu (*Pratique des Accouchemens*), and many other celebrated obstetric writers, considered the birth of the infant impossible unless the joint was relaxed or lacerated; but De la Motte maintained that either of these states was very rarely an obstacle to delivery. (*Traite Complet des Accouch.*) Burton ridiculed the practice of Deventer, and most judiciously condemned it. (*New System of the Art of Midwifery*). The separation of the coccyx is not of rare occurrence with women who become pregnant at an advanced age, for example, from thirty or forty years and upwards. Women at this age have generally slow and painful first labours. Most practical obstetricians have attended cases of this description.

Smellie describes a case of this kind, of a woman aged thirty-three years, and Velpeau one aged thirty-one, and another aged thirty-seven, who had the coccyx separated and died undelivered, (*Op. cit.* 1835). The coccyx is generally broken off in obstetric demonstrations of the pelvis of the skeleton, during lectures on midwifery. I have no doubt that the sacro-coccygeal articulation is often injured by parturition, and I have attended many women who complained of excruciating pain in this part for days, and sometimes for weeks or months after delivery. The nature of the injury can be often ascertained by external examination; but in some instances, the index finger must be passed into the rectum, and the thumb applied, in apposition, on the sacro-coccygeal joint externally, when the state of the articulation can be readily detected. If the sacro-coccygeal joint is much injured, we may expect rapid inflammation and its consequences; and in such cases leeches, cupping, purgation, and the antiphlogistic regimen, should be speedily employed. One of my distinguished correspondents, Dr. Dewees, the late eminent obstetric professor in the University of Philadelphia, describes a most severe pain of this part, after parturition, which he could only subdue by large doses of camphor, opium, and oil of juniper. I am disposed to think that this pain is often induced by the contusion or dislocation of the joint, caused by the pressure of the infant's head. It is generally admitted that the os coccygis allows of regressive motion, to the extent of an inch, during parturition, which greatly facilitates the passage of the infant's head, by assisting in enlarging the outlet of the pelvis.

After mature reflection on the mechanism of human parturition, and some experience, I have been led to the adoption of a very important, and, as far as I know, a new practice in the stage of labour under consideration, viz., that if the obstetrician press the index and middle fingers of the left hand on each side of the coccyx, when the infantine head is being expelled upwards, towards the maternal abdomen (see *plate 2*,

fig. 1, plate 16, fig. 1), in natural labour, he must either press on the forehead, on the cheek-bones, on each side of the nose, or on or under the chin, and very materially assist the elevation of these parts towards the pubes or abdomen of the parent (see *plate 2, fig. 1*), while, at the same time, he supports the perinæum with the right hand (see *plate 15, fig. 2*), and prevents its laceration, and also any injury to the sacro-coccygeal joint. This practice is not advised in any obstetric work with which I am acquainted, although no duly educated medical practitioner can question or deny its judiciousness; or doubt the mischiefs done by those unacquainted with the mechanism of natural parturition.

Ossa Innominata, Ossa Coxalia—Haunch or Hip Bones.—These bones could not be compared to any known body by the older anatomists, and hence called nameless bones. Some of the French writers, Capuron, Maygrier, Velpeau, &c., adopt the term of Celsus, and designate them the coxal bones, describing each as a single bone, although the three divisions apparent in infancy disappear and cannot be traced in the adult. In this country we also retain the names of the three primitive divisions, and describe each innominatum as consisting of three parts—the *os ilium*, *os ischium*, and *os pubis*. See explanations of, (*plate 1, fig. 1*).

The *ilium*, or hip-bone, is the most posterior and extended of these bones; its form is somewhat triangular or quadrangular: it presents two surfaces, an external and internal, three sides, and three angles. The external surface is both convex and concave, and is called the *dorsum*, or back, by anatomists. The internal surface is called the *iliac fossa*, or depression, and is very capacious, so as to allow space for the development of the gravid uterus (*plate 1, fig. 1, aa*). The superior border of this bone resembles an italic *S*, and is called the crest of the ilium (*bb*). There is a small projection from its posterior third towards its termination, from which a ligament runs to the transverse apophysis of the last lumbar vertebra. Towards the termination of the anterior border there are two eminences, the anterior superior and inferior spinous processes of the ilium; on the opposite extremity of the bone are the posterior superior spinous process, and the posterior inferior process, the latter being united to the sacrum. The bone is prolonged posteriorly, and forms the great and small sciatic notches (*plate 1, fig. 1*). Such are the obstetric peculiarities of the iliac bones; but there are many others which I purposely omit, though described by Burns, Capuron, Velpeau, Duges, and many other obstetric professors, because they are not concerned in the function of parturition.

The *pubis*, or share-bone, is so called from the attachment of the genital organs to its anterior part (*plate 1, fig. 1, dd*); it is divided into two branches, the superior or ileopubic or superpubic, and the inferior, or ischeopubic or subpubic. The superior branch is nearly triangular in its middle part, is flattened as it becomes enlarged towards its anterior extremity, and is thickened towards the ilium; and hence the superior surface is slightly sinuous and concave; it is larger behind than before; and thus the internal and external surfaces present a contrary arrangement. The subpubic branch descends obliquely and laterally; it is flattened on both its surfaces, and is larger at its commencement than

at its termination; it is about seven or eight lines long. Each os pubis is united with its fellow in front, and the junction is named the *symphysis pubis*. The width of this joint is generally from an inch and a half to two inches. The arch formed inferiorly under the symphysis, by the bones on each side, is named the *arch of the pubis* (*plate 1, fig. 1, ee*). Of this hereafter.

The *ischium*, or lower part of the hip, vernacularly, presents two surfaces, two extremities, and two borders. The external surface of this bone is convex and irregular, and forms a part of the acetabulum, or socket, which receives the head of the thigh-bone. The internal face is concave, and offers an inclined plane from above downwards, behind backwards, and without inwards; and this plane should be recollected by obstetricians, as the infant's head sweeps along it, in descending towards the perinæum and abdomen. (*See plate 1, ff*). The superior extremity of the bone is attached insensibly to the ilium (*plate 1, fig. 1*); the inferior is called the tuberosity of the ischium, and is surmounted by a small branch which joins the ramus, or ascends, and forms the lower branch of the pubis. The anterior internal border concurs in forming the round or subpubic or oval foramen (*plate 1, fig. 1, hh*); and the posterior or external border is concerned in the sacro-ischiatic notch (*plate 2, fig. 1*). This last, as its inferior third, presents a triangular prominence, oblique behind and inferiorly, which is called the *spine of the ischium*.

The *foramen ovale, f. thyroideum* (*fig. 1, hh*), is nearly closed by the obturator ligament, and through which nerves pass to the superior part of the lower extremities, and these are often pressed on by the infant's head, while descending during parturition; the consequence of which is pain, numbness, or some uneasy sensation in front of one or both thighs. This pressure does not always occur, on account of the difference in size of the foetal head, and of the maternal pelvis. When the pelvis is large and the head of moderate or small size, the woman may not suffer any pain in the anterior or any other part of the thigh or leg. In some cases, however, the pain is very severe for a short time, while the foetal head is descending towards the outlet; but relief is generally afforded by friction with the hand on the front or painful part of the affected limb, or by tying a handkerchief tightly above the knee, or by pressing firmly round the thigh with both hands.

Of the Articulations or Symphyses of the Pelvis.—The articulations of the bones of the pelvis do not differ from those of the same kind in other parts of the body. They are of a mixed kind, according to ancient authors, and partake of synarthrosis, and more so of amphiarthrosis, which is the articulation by continuity of the moderns.

The articulations of the pelvis are generally called symphyses—as the symphysis of the pubis, of the sacrum and ilium, of the sacrum and coccyx, and of the sacrum and lumbar vertebra. It is necessary to examine the pelvic joints in the recent subject, in order to understand their exact structure; and then we find the following formation.

The joints of the pelvis are the two sacro-iliac posteriorly (*fig. 1, cc*), the sacro-coccygeal inferiorly, and the pubic anteriorly (*dd*). The sacro-coccygeal and pubic joints are also occasionally inflamed by the

contusions which they are sometimes destined to sustain during parturition; and their surfaces may be entirely separated from each other by ulceration. The symphysis pubis may become separated, and when such injury occurs, the most active treatment is required. Happily, such separation is comparatively rare; but many examples of it have been recorded, and some cases have fallen under my own observation. This joint is sometimes anchylosed, according to Degranges, Burns, Velpeau, &c., and in such cases can rarely be inflamed, or the bones that compose it, separated. They may, however, be partially or totally separated, and may give rise to severe pains for an indefinite period after delivery. (Lauverjat), while Pineau, Chapuis, and Louis, deny the possibility of this disease.

The sacro-iliac symphyses may be similarly affected, but they very rarely separate, though there is evidence that they are occasionally relaxed. The sacro-iliac joints are remarkably strong in consequence of the manner in which they are united, or, to use a mechanical term, morticed into each other. They have also strong bands of ligament extending across the posterior and superior edges. These joints are strengthened in front by thin, firm ligamentous expansions, which do not diminish the cavity of the pelvis.

There are likewise two strong ligaments on each side inferiorly, which connect the sacrum and ischium, and contribute more to the formation of the outlet, or lower pelvic aperture, than to the strength of the sacro-sciatic joints. These are termed the anterior and posterior sacro-schiatic or sciatic ligaments. They arise from the sides of the sacrum and coccyx; the former being attached to the spine, and the latter to the tuberosity of the ischium (*plate 1, fig. 1, ff*).

The ossa innominata are united in front, and the joint is called the symphysis pubis. There is an interarticular substance interposed between the two osseous surfaces, and a fibro-cartilaginous substance covering each of these. The external surface of the joint is covered with strong bands of ligament, which are more bulky, for the reason already assigned, than those on the internal surface. There is also a ligament at the apex of the arch, termed *sub-pubic*.

The last joint of the pelvis is the union of the sacrum and coccyx, formed by an intervening substance similar to that between the vertebræ, and secured by anterior and posterior ligaments. The sacro-coccygeal joint admits of flexion and extension, and is said by many to be the only joint of the pelvis capable of motion. It is, however, certain, that in many inferior animals, as the cow, the other articulations may become relaxed before or during delivery; and it is generally supposed that a similar relaxation, though only in a slight degree, occurs in the human female. As a general proposition, it may be maintained, that inflammation, abscess, or separation of the pelvic joints is of comparatively rare occurrence. When these diseases happen, they are to be treated upon the ordinary principles of surgery. It is scarcely necessary to observe, that inflammation of joints, or of cartilages and ligaments, require very active treatment.

The principal *ligaments* of the pelvis, in an obstetric point of view, are the *internal and external sacro-schiatic* on each side (*ll*), and the

obturator; and these are also liable to rigidity or relaxation. The former assist in the formation of the outlet of the pelvis, and, in an advanced period of life, may offer considerable impediment to the parturient process.

The obstetrician may also be informed that the pelvis is lined by muscles, contains arteries, nerves, and lymphatics, the uterus and its appendages, the urinary bladder, and rectum, all of which organs may be more or less injured by natural or preternatural parturition.

Dimensions, Directions, Planes, and Axes of the Pelvis.—The pelvis presents an external and internal surface, a base and summit. The external surface serves for the attachment of the coxo-femoral muscles, and is divided into four regions, the anterior, posterior, and two lateral. The internal surface alone is concerned in the mechanism of natural parturition.

The pelvis is divided into the great, superior, abdominal, or false; and the small, inferior, or true pelvis, the linea ileopectinea, when carried across the promontory of the sacrum, being the line of demarcation between them. The inferior, or true pelvis, is again subdivided into the *brim* or *entrance*, *introitus*; the *cavity* and *outlet*, *detroitus*; it contains the internal genito-urinary organs, the rectum, and the hypogastric and sacral vessels and nerves. The true pelvis has two apertures, which are also called the superior and inferior strait.

The *superior, abdominal, great strait, isthmus, introitus, or boundary* of the pelvis, is the osseous margin which separates the true from the false pelvis, formed by the superior margin of the sacrum, the linea ileopectinea, and the superior margins of the ossa pubis (*plate 1, fig. 1*). Its form is variable, frequently oval (Deventer, Smellie), cordiform (Levret), elliptic (Burton, Chaussier, Flammand, &c.), or triangular.

It is measured by four diameters; the *antero-posterior*, which extends from pubis to sacrum, and is also named the *sacro-pubic*, the *conjugate* or *short diameter* of the brim (*plate 1, fig. 2, cc*, and *plate 2, fig. 1, cc*)—the *transverse*, or *lateral*, which extends from one ilium to the other (*plate 1, fig 2, bb*), and hence called *bis-iliac* (*bb*), and the *two oblique* (*aa*), which extend from the sacro-iliac symphyses to the opposite acetabula; and these are denominated the *long diameters* of the brim. The *antero-posterior diameter* measures on the skeleton about four inches, according to British and French writers, and three inches five-eighths with the soft parts; the lateral or *transverse* five inches, or five and a quarter; but it is diminished half an inch on each side in the recent subject, by the presence of the psoæ and iliac muscles and vessels, and does not really present more than four inches during labour. The *oblique, long, or diagonal diameter*, measures five inches and a quarter or half, and is considered the longest by almost all writers. These dimensions are subject to numerous varieties, and are scarcely the same in any two pelvises, and should not be understood but in a general manner. There are scarcely two writers who agree in their account of the length of the pelvic diameters, as they must vary according to the size of the woman. Velpeau has added another, which he terms the *sacro-cotyloid diameter*.

In recapitulation, I may observe, that the *shortest diameter* or ad-measurement of the brim or superior entrance of the pelvis, sacro-pubic

or conjugate, extending from the sacrum to the pubis, measures in general, without the soft parts, from about four to five inches, with the soft parts, three inches and five-eighths. The *transverse, lateral, or bis-iliac*, measures generally about five inches and a quarter on the denuded bones, and about four inches in the living subject. The *oblique* or *longest* diameter extending from either sacro-iliac symphysis to the opposite acetabulum, measures five inches and a half on the bones, and about four inches and five-eighths, with the soft parts attached.

Some authors, however, maintain, that the transverse diameter of the brim is the longest of the four, but the majority of eminent obstetricians consider the oblique the longest admeasurements; and with these I agree in opinion. The length from the summit of one ilium, or hip-bone, to that of the other, in a well-formed woman, is from ten to eleven inches, and that between the two antero-superior spinous processes, about nine inches. These admeasurements do not influence parturition, though they may uterine development during the last months.

The reader will find a full account of the conclusions of the various obstetric authors, in M. Velpeau's excellent work already referred to. According to this truly scientific and judicious professor, the general admeasurements on a large number of pelves, were four inches and three lines; five inches and four inches and a half; and about three inches and eight lines for the sacro-cotyloid diameter. He cannot agree with professor Burns that the transverse diameter measures from five and a half to six inches; the oblique from five to five and a half, and the antero-posterior or sacro-pubic, four inches and three quarters.

The *inclination* of the superior strait in the erect position is not horizontal; but its posterior part is more elevated than its anterior, so that it is directed from above downwards, and from behind forwards. It varies from thirty-five to sixty degrees.

The *axis* of this strait or aperture is represented by a line, drawn from the umbilicus to the inferior part of the sacrum, and, according to some, to the apex of the coccyx. Levret considered it thirty-five, Smellie and Muller forty-five, Bang fifty-five, Osiander and Carus thirty, and Nægelé, who examined eight hundred women, from fifty-nine to sixty degrees. The inclination of this axis has occupied the consideration of obstetricians for more than a century. It diminishes in women who assume the sitting or recumbent posture, who curve the body by flexing the upper and lower extremities towards each other; and is increased by those who carry loads on the abdomen, as the labouring classes, as fish and fruit sellers, who in maintaining the equilibrium of the trunk, throw the superior extremities backwards towards the central line of the body.

The axis of the trunk of the human body is nearly perpendicular to the horizon, though if continued would fall upon the symphysis pubis. The axis of the brim of the pelvis is a line drawn from the umbilicus (navel) to the apex of the sacrum, or sacro-coccygeal joint; and the axis of the outlet if continued would incline towards the promontory of the sacrum or abdomen of the woman, as represented in *plate 2, fig. 1, ff.*

The brim and outlet are directed towards the anterior or front aspect of the body; in fine, the axes of the pelvis represent a curved line pass-

ing through the centres of the brim, cavity, and outlet of the pelvis, which are represented in *plate 2, fig. 1, e f g h*.

A knowledge of these facts leads obstetricians to advise the parturient woman to curve the body by drawing up the inferior extremities towards the abdomen, and at the same time bending the head and trunk towards the knees, thus lying in a curved position, while the foetal head is passing through the pelvis. This position diminishes all the axes of the pelvis, and facilitates parturition. (See *plate 2, fig. 1; plate 15, fig. 1, 2, 3*).

The *cavity of the pelvis* is divided into four regions: the anterior, posterior, and two lateral. The anterior region is slightly concave from side to side, formed by the posterior part of the symphysis and body of the pubis. The posterior region is formed by the anterior surface of the sacrum and coccyx, is concave, and presents foramina for the passage of the crural nerves. The lateral regions form a plane, inclined above and inwards, they present the sciatic notches, which are converted into apertures by the sacro-ischiatic ligaments (*plate 1, fig. 1, ll*), a square surface which corresponds to the acetabulum and the sciatic spine, more prominent within the pelvis than the parts situated before and behind, offering by this disposition two inclined planes, an anterior and posterior. These planes assist in impressing on the head, the rotation necessary for placing its antero-posterior diameter in the long diameter of the outlet or inferior strait. The anterior plane of the side pushes the presenting part of the head under the arch of the pubis, while the posterior forces the front part of the head into the curvature or concavity of the sacrum, (*plate 2, fig. 1; plate 16, fig. 1*).

Dimensions of the Cavity of the Pelvis. Antero-posterior Diameter.—From the middle of the symphysis pubis to the middle of the sacrum measures about five inches, on account of the concavity of the latter, which affords an inch in depth. The *transverse diameter* measures about four inches and a half. Meckel, Guillemot, &c. differ as to the admeasurements. It is said that the transverse diameter, between the spinous processes of the ischia, is longer than the antero-posterior from before backwards. These admeasurements are diminished as they approach the inferior part of the pelvis.

The *depth* of the anterior parietes of the pelvis is from an inch and a half to two inches; of the posterior, from four inches and a half to six inches; and of the lateral parietes, from three inches and a half to four inches.

It is manifest, that from this irregularity of depth in the different parts of the parietes or walls of the cavity of the pelvis, that a part of the infantine head may be at the outlet and under the pubis anteriorly, while the remaining parts have to traverse the cavity of the sacrum posteriorly, as well as the parietes laterally. Those who are ignorant of this fact, often suppose, on feeling a portion of the back of the head near the pubis, that delivery will be immediate, while the educated and experienced obstetrician well knows, that it may not be accomplished for several hours. This is generally the case in primiparous or first labours; but the head may rapidly descend and be protruded, when in the position referred to, in women who have been previously delivered; and more particularly when the parturition is natural (*plate 2, fig. 1*).

The *direction* of the pelvic cavity represents a canal very much curved before, and falling perpendicularly from its axis to its two sides. (See *plate 1, fig. 1*; *plate 2, fig. 1*).

Its *axis* is represented by a curved line passing through the middle of the canal, following the curvature of the sacrum, and towards the inferior third of the vagina (*plate 2, fig. 1, gg*).

It is, however, to be borne in mind, that the concavity or hollow of the sacrum is much deeper in the female than in the male of the human species, so as to adapt this part for the lodgement of the infantine face, while the convergence of the apex or point of the sacrum and spines of the ischia is admirably calculated to assist in the bevelling of the rami or branches of the pubis, and in directing the vertex or crown of the infantine head forwards and upwards, towards the abdomen of the mother. (See *plate 2, fig. 1*; *plate 16, fig. 1, 2*, and also the mechanism of human parturition in next chapter).

Inferior Strait. The Inferior or Perineal Strait, Summit of the Pelvis or Outlet—is formed by the point and edges of the coccyx, the edges of the sacro-ischiatic ligaments, the tuberosities of the ischia, and the ischio-pubic branches; it is quadrangular, triangular or somewhat cordiform, as it often represents the figure of a heart of a playing card. (See *plate 1, fig. 3, a b c*).

The inferior strait has four diameters, the *antero-posterior, coccy-pubic, or long diameter*, which extends from the extremity of the coccyx to the arch of the pubis (*plate 1, fig. 3, a a*); the transverse, *bis-ischiatic, or short diameter*, extending from the posterior and internal parts of the tuberosity of the ischium to the opposite one (*plate 1, fig. 3, b b*); and two *oblique diameters*, which extend from the reunion of the ischiatic and pubic branches to the middle of the sacro-ischiatic ligaments. All these diameters measure four inches; but the antero-posterior is said to measure five inches, on account of the retrocession of the coccyx in most women during parturition (*plate 2, fig. 1, d e*).

The arch of the pubis, or anterior part of the pelvis, is four inches broad at its base; the length of each branch of the arch is three inches and a quarter. The arch of the pubis is much wider in the female than in the male; and in the former its rami or branches are bevelled or twisted in such a manner as to direct forwards and upwards any part of the infant which may be passing through the outlet of the pelvis.

The *axis of the inferior strait* is represented by a line drawn from the sacro-vertebral union, or obstetrically, the *promontory of the sacrum*, through the centre of the vagina, or centre of this strait (*plate 2, fig. 1, ff*).

If we remember that the coccyx is depressed by the head of the infant during delivery (see *plate 2, fig. 1*), we can readily understand that the posterior extremity of the coccy-pubic, or long diameter of the outlet, is lower than the inferior extremity. The axis of this strait or the outlet, descends obliquely from below upwards, and behind forwards, at an angle of fifteen or twenty degrees, running from the anterior surface of the first or second bone of the sacrum (*plate 2, fig. 1, ff*), to the middle of the space which separates the anterior portion of the tuberosities of the ischia. The axis then increases at the centre of the pelvic

cavity, with that of the superior strait, as remarked by Levret, the perinæum becomes distended, prolonging the coccyx or posterior wall of the pelvis forwards and upwards, so that the infant's head ascends towards the pubes or abdomen of the parent (see *plate 2, fig. 1*). It is also to be remembered, that the vertex or crown of the head (infantine), the forehead, face, chin, and neck, are gradually expelled from the coccyx to the pubes, or in other words, from below upwards, towards the abdomen of the mother (see *plate 2, fig. 1, h h h h*). The axes of the different parts of the pelvis must be regarded not only during natural labour, but also in all manual and instrumental operations.

It is here important to observe, that the brim and outlet of the pelvis are turned towards the abdomen, or anterior aspect of the body; although the axis of the former is a right line from the umbilicus to the apex of the sacrum (*plate 2, fig. 1, e e e*); while that of the outlet (*ff*) if continued upwards, would be directed towards the abdomen, and perhaps terminate at or above the promontory of the sacrum (*h h h h*). It must therefore be obvious, that the axes of the brim, cavity, and outlet of the pelvis of the human female form a curved line, passing respectively through the centres of the parts just mentioned; and that the head of the infant in descending through the pelvis, must first advance downwards and backwards, and while in the cavity and outlet, downwards forwards, and upwards, towards the abdomen of the parent (see *plate 2*, and the chapter and plates regarding natural parturition, *plate 15, 16*).

The reunion of the axes of the brim, cavity, and outlet, form a curve, the concavity of which is in front, and the central lines of the superior and inferior straits forming the extremities (*plate 2, fig. 1, e e f f g g h h h h*). The obstetrician is to bear in mind the direction of the planes of the sacrum, coccyx, and perinæum, as these direct the infant's head with geometrical precision.

Saxtorph, Stein, Camper, Choulant, Baker, Bætschler, Nægelé, Levret, Rœderer, Muller, Ould, Carus, and many moderns, differ concerning the axes of the superior and inferior apertures of the pelvis. (Velpeau). This last author well observes, that the inclination of the superior and inferior planes is about sixty degrees during parturition, and during the birth of the foetus about a right angle. (*Op. Cit.*) The plane of the horizon is a line represented in *plate 2, fig. 1, b b*; the plane of the brim or superior entrance of the pelvis, *c c*, which forms an angle of about thirty-five degrees below the plane of the horizon, *b b*; and the centre of the plane of the outlet is the line marked *d d*.

It is also to be recollected that if the axes and diameters of the superior and inferior straits were not reversed in women whose attitude is erect, the contents of the gravid uterus would be expelled on the slightest exertion, especially in the last months of pregnancy. The medical practitioner must perfectly understand this part of obstetrics, or he can never comprehend the mechanism of parturition.

He ought to know that the foetal head descends during parturition in the course of the lines delineated in *plate 2, fig. 1, e f g h*, which represent the axes of the brim, cavity, and outlet of the pelvis, and in which directions, according to the circumstances of each case, the obstetrician must, in difficult parturitions, extract the foetus by manual or instrumental

operations. If, ignorant of a knowledge of these most important obstetric facts, any person who is so unprincipled, rash, and inhuman, as to attempt to assist a parturient woman, must do her dangerous, and too often fatal injury, as well as almost invariably destroy the innocent cause of her suffering. But, before I notice this subject, it is necessary to describe the obstetric relations of the foetus.

CHAPTER II.

OBSTETRIC RELATIONS OF THE FŒTUS.

DIMENSIONS OF THE FŒTAL HEAD, SHOULDERS, AND PELVIS—ADAPTATION TO THE MATERNAL PELVIS IN PARTURITION—MECHANISM OF NATURAL LABOUR BY THE HEAD AND ABDOMINAL EXTREMITY OF THE FŒTUS; OR BY THE BREECH, KNEES, AND FEET—SCIENTIFIC PRACTICAL INFERENCES—FATAL EFFECTS OF MAL-PRACTICE.

I HAVE next to notice the obstetric peculiarities of the foetus, and its adaptation to the parent in the function of human parturition. Nothing can be more perfect, or more wisely ordained, than the relations between the mother and infant in the process of nativity. This will appear obvious by the facts which I shall now adduce.

The position of the foetus in the womb in the latter months of pregnancy deserves attention (see *plate 12*). The head is placed downwards towards the uterine orifice, and, during labour, the chin bent on the chest, the arms are closely applied to the sides, while the fore-arms and hands either cross each other or the breast; the thighs are raised towards the abdomen, the legs are either in the same position, or are bent on the thighs, so that the figure of the foetus is oval, the head or smallest end being downwards, and the larger, the breech, being superiorly. Such is the most frequent position of the infant in the womb in the last month of pregnancy and during labour; but it may be reversed, the head being upwards and the breech downwards (see *plate 26*); and it is also to be remembered, that almost every part of the infant may be the descending or presenting part during labour, as will appear on reference to the whole of the engravings which belong to this work.

Dimensions of the Infant's Head, and its passage through the Pelvis during Parturition.—The parts of the infant concerned in delivery are, the *head*, the *shoulders*, and the *breech*, *pelvis*, or *hips*.

The HEAD of an infant at birth, when separated from the body, is obstetrically divided into regions—the *vertex*, *summit*, or *crown*; the *base of the skull*; the *face*; and *temporal regions* (*plate 2, fig. 2*).

Vertex—summit or crown of the head—is characterized by certain marks, and these are, the *anterior* and *posterior fontanelles*, or *openings of the head* (*plate 2, fig. 3, a b*), and the *sagittal suture*, or separation between the bones (*cc*), which runs from the forehead to the back of the head. These openings may enable the obstetrician to determine the presentation in most cases of natural parturition.

The *base of the skull* may present when the infant advances by the feet or breech, or when the body is separated from the head (*plate 2, fig. 2, a b c d*; *plate 25, fig. 1, 2*).

It is obvious that in order to understand the mechanism of parturition, it is necessary not only to know the widest admeasurements of the female pelvis already described, but also those of the foetus, more particularly of the crown and base of the skull, and other parts of the head; the width of the shoulders, and breech or pelvis of the infant, as the largest parts of the latter are adapted, with mathematical precision, to the largest dimensions of the bones of the mother, in natural labour; which will be fully explained hereafter.

The anterior fontanelle is somewhat lozenge-shaped, and is called the great (see *plate 2, fig. 3, a*), while the posterior or lesser is triangular (*b*).

The *face* possesses signs which can seldom be mistaken.

The *temporal regions* are discoverable by the ears.

The head is measured, like the female pelvis, in different directions, for the purpose of comparing natural with preternatural presentations of this part during parturition. It presents five diameters and two circumferences.

Diameters.—*a.* The *occipito-frontal* extends from the back of the head to the forehead, generally measures five inches, and is called the *long diameter of the head* (see *plate 2, fig. 3, c c*).

b. The *bi-parietal* is from one parietal protuberance to the other (*fig. 3, d d*), across the crown of the head (from ear to ear), which measures three inches and a half; and is also termed the *short diameter of the cranium*, in contradistinction to the former.

c. The *occipito-mentary*, or *oblique diameter*, proceeds from the back of the head to the chin (*fig. 2, a a*), and measures four inches and a quarter. This will be the presenting part of the head when the infant comes into the world by the feet or breech.

d. The fourth diameter of the infant's head is from the vertex or crown to the base of the cranium (*fig. 2, b b*), and usually measures about three inches and a half; some say four inches and a half; but the difference depends on the comparative size of the head. This becomes the presenting diameter when the head is elongated towards the neck, and the forehead is directed towards the pubis, when the term fontanelle presentation is applied by some obstetricians.

e. The fifth diameter of the head is from one mastoid process or protuberance behind each ear to the crown (*fig. 2, b b*), and measures about three inches and a half, or four inches.

The longest admeasurement of the head, superiorly, is from before backwards (the *long diameter*), and the shorter from ear to ear (the *short diameter*).

The head is also measured from the vertex to the chin (*fig. 2, b a*), and the length is about five inches. This diameter is to be considered in certain face presentations (see *plate 2, fig. 2, b a*), which are always more difficult than the natural, hereafter described.

Lastly, the admeasurement of the head, from the posterior extremity of the sagittal suture to the occipital foramen, is about three inches and a half (see *plate 2, fig. 2 and 3*).

It is scarcely necessary to observe, that the preceding dimensions or diameters of the infantine head, before and at birth, must vary in different cases; in fact, few are exactly alike, as few infants of the same age are of the same size or stature.

As the infantine head at birth is most wisely composed of several bones, which are separated by sutures, it may be considerably compressed, when the pelvis is small, as the bones may, and generally do, lap over each other during labour, unless when perfectly ossified, which is a rare occurrence; and thus the diameters may be less than those already mentioned. In such cases the head is diminished in one diameter and increased in the other (see *plate 2, fig. 2, 3*).

It is also to be borne in mind, that the head may be astonishingly enlarged by hydrocephalus, and, consequently, the diameters may be of much greater extent than are usually observed (see *plate 38, fig. 2*).

The pelvis of the infant during labour descends in the axes of the brim, cavity, and outlet of the maternal pelvis, like the head and shoulders, nature thus adapting the largest parts of the offspring to those of the mother (see *plates 23, 24*).

It follows from the preceding descriptions, that if the head of male infants is supposed by some to be about one thirty-second part larger than that of female, there would be a greater mortality of the former during tedious or difficult labours, (Dr. Clarke, of Dublin; Dr. Bland, &c.)

The two circumferences of the head are:—1. The perpendicular division of the head into two hemispheres: the extent about fourteen or fifteen inches. 2. The perpendicular into two halves, anterior and posterior: the extent of this circumference being from ten to eleven inches.

Movements of the Head upon the Trunk.—The head of the foetus may be flexed or bent upon the chest, partially turned upon the back, or inclined on either shoulder. It may also describe a fourth part of a circle or rotation.

The infantine head before birth may be unusually diminished or increased in size, and in the former state readily escapes through the cavity and outlet of the pelvis. It may be enlarged by compression, extravasation of blood under the scalp, by gas disengaged after death, by incipient decomposition or putrefaction, by hydrencephalus, or by protrusion of the brain, when the upper part of the cranium is wanting, as in acephalous, or what the German obstetricians term “cat-head foetuses.” Such enlargements of the head, with the exception of the first mentioned, are of comparatively rare occurrence.

THE SHOULDERS OF THE INFANT.—The shoulders of the foetus, considered relatively to parturition, are only to be described as regards their size. They measure from four to five inches in breadth, but may be reduced considerably, perhaps an inch or more, by compression.

The long admeasurement of the shoulders is transverse to that of the head, which is from before backwards, so that the long diameters of the head and shoulders cross each other at right angles (see *plates 15, 16*). It will appear, by reference to *plate 16*, that when the head is passing through the outlet, one shoulder is turned to the oblique or long diameter of the brim of the pelvis, some say to the transverse or bis-iliac,

and when the shoulders descend into the cavity and outlet, they pass along the axes of these parts (see *plate 2, fig. 1*; *plates 15, 16, fig. 2, 3*).

THE BREECH OF THE FŒTUS.—This part is also to be considered as it regards parturition. It is composed of fourteen bones in the fœtus, separated by cartilages and membranes, and capable, like the head, of considerable compression, which facilitates labour. The extent from one hip to the other is about five inches, and this line is the long diameter.

But when the vertex or crown of the head presents in natural labour, the chin is depressed on the chest, so that the presenting part of the head is from three to four inches, which, in passing through the oblique diameter of the brim, five inches and a half, has abundance of room to escape.

The longest diameters of the fœtus are adapted during natural parturition to those of the mother. The longest diameters of the brim of the female pelvis are the oblique (*plate 1, fig. 2, a a*), whilst that of the inferior strait or outlet is from before backwards, the antero-posterior or coccy-pubic (*fig. 3, a*); and it follows that the largest parts of the infant must be placed obliquely at the brim or superior strait of the pelvis, and must undergo a movement of rotation, like the head, to place themselves antero-posteriorly at the inferior strait.

The depth of the pelvis posteriorly being from five to six inches, and anteriorly from an inch and a half to two inches, enables us to comprehend how the occiput, or presenting part of the head, escapes first during labour. Thus we feel the occiput or back of the head under the pubis (*plate 15, fig. 1*), while the forehead is on the perinæum, and the face in the concavity or hollow of the sacrum, for one or more hours before the head is born (see *plate 14, fig. 3*). Young and uneducated obstetricians often fall into error, by supposing that delivery must be speedily accomplished on feeling the head under the pubis or through the vagina; not knowing that the forehead and face are situated in the concavity of the sacrum, and must ascend towards the pubis before the head can come into the world (*plate 14, fig. 3*; *plate 15, fig. 1, 2, 3*; *plate 16, fig. 1*).

The axes of the pelvis form a curved line, extending from the cavity of the pelvis along the coccyx and perinæum towards the pubis and maternal abdomen, the concavity of which is turned towards the pubis, and the convexity towards the sacrum (see *plate 2, fig. 1, h h h h*); so that the fœtus, in being expelled, follows the course of this line or direction, the occiput, or back of the head, escapes on the pubis, while the face and chin ascend over the perinæum, and the obstetrician follows this curved line in every operation of traction. It is in this direction he extracts with the forceps (*plate 31, fig. 2*) and lever (*plate 33, fig. 1*), and also with the hand in the operation of version or turning (*plate 25, fig. 2*).

In proof of this statement, I shall now proceed to describe the mechanism of natural parturition by the head and feet, and also the application of the forceps.

Previously to describing the modes in which the human fœtus passes into the world, it is necessary to explain certain terms which are used obstetrically, and these are what are called *presentation* and *position*.

The first means that part of the foetus which presents or descends during labour through the maternal pelvis; and the second is that which relates to the position of the pelvis with regard to the presentation. Thus if it be said, the vertex or crown of the head descends, this is designated, in obstetric phraseology, the presentation; and if the occiput is towards the pubis, sacrum, or ischium, as the case may be, this is termed the position.

It is always most important to determine, when possible, the presentation and position of the foetus; but there are cases in which these points are ascertained with difficulty, or, for some time, not at all. In the great number of instances, however, the head is the presenting part, and I shall first describe its egress.

Mechanism of Natural Parturition, or Labour by the Head.—Natural parturition, according to British authors, terminates by the presentation of the vertex, or crown of the infant's head, the pelvis of the mother being of the natural dimensions.

Parturition may, however, terminate naturally by the *head, feet, knees, or breech*, according to foreign obstetric writers; a fact which cannot be doubted.

Natural Parturition by the Head.—Natural parturition may be effected by four positions of the head, which correspond to the oblique diameters of the maternal pelvis.

First Position. Principal Relations.—The occiput is turned to the left acetabulum or cotyloid cavity, and the forehead to the right sacro-iliac joint, symphysis, or synchondrosis. The posterior region of the infant is in front and to the left; the anterior is backward and to the right; and the feet are towards the fundus, or upper part of the uterus.

Nægelé contends that the forehead is turned to the left sacro-iliac symphysis, in a great majority of parturitions—the most general opinion. In this case, the head may occasionally, though rarely, be expelled with the face to the pubis.

Mechanism.—Pressed by the contractions of the uterus, the head is flexed or bent upon the chest, or oblique from the occiput to the chin, and its occipito-mentary diameter becomes parallel to the brim or superior strait of the pelvis. Thus the vertex, or crown of the head, presents or descends; the vertex advances; with one ear towards the pubis, and the other towards the sacrum (see *plate 14, fig. 1*), it gradually sweeps over the concavity or hollow of the sacrum; arrived at the inferior strait, the face is towards one side or ischium, and the occiput to the other (see *plate 14, fig. 2*). It now encounters considerable pressure from the planes of the pelvis, the rami of the ischia, and sacro-ischiatic ligaments, which effect on it a rotatory motion, by which the face is turned into the concavity or hollow of the sacrum, and the occiput to the arch of the pubis (*plate 2, fig. 1; plate 14, fig. 3*).

The long diameter of the infant's head is now in the long diameter of the outlet of the maternal pelvis, and is to be raised towards the abdomen (*plate 2, fig. 1; plate 16, fig. 1*), so that the crown of the head, the forehead, and face, may be elevated towards the pubis and gradually expelled. Dr. Nægelé contends, that it is the parietal, and not the

occipital bone, which presents at the left sacro-iliac diameter, and that it is the ischium, and not the hip, that appears in the long diameter of the outlet,—a position I have also often observed.

When the face is in the concavity of the sacrum, the head is advanced more and more, by the contractions of the uterus (labour pains); it gradually distends the perinæum and genital fissure (*plate 15, fig. 1, 2*), and after each pain ascends into the concavity of the sacrum. Each pain distends the perinæum and external genital aperture (vulva, pudenda), and after a longer or shorter interval, the resistance of the external genitals is overcome, and the head escapes externally (*plate 15, figs. 1, 2, 3*). At this moment the occiput turns towards the pubis, the face advances along the sacrum and perinæum, and the back and middle of the head having escaped the genital aperture, the perinæum (soft parts) expands over the forehead and face, the uterus pressing forcibly, and the head escapes towards the pubis or abdomen of the mother (see *plate 2, fig. 1*; *plate 16, fig. 1*). When the head has escaped, the occiput is turned towards the left groin, and the face towards the posterior and internal surface of the right thigh (see *plate 16, fig. 1*). By this rotation the shoulders are turned in the oblique diameter of the brim of the pelvis; one descends into the concavity of the sacrum, the other is turned to the pubis (*plate 16, fig. 2, 3*), and when they arrive at the inferior strait or outlet, they are rotated or turned by the inclined planes, in the same manner as the head, one advancing towards the pubis, and the other towards the os coccygis (*plate 16, fig. 3*); that is, the long diameter of the infant's body passing in the long diameter of the outlet of the maternal pelvis. The right or left shoulder is now towards the arch of the pubis, and the other towards the sacrum. At this moment the head changes its relations; the face is directly turned to the middle and internal part of the right thigh, and the occiput to the internal and middle part of the left (*plate 16, fig. 1*). The inferior or lower shoulder receives all the contractions of the uterus, it speedily appears at the genital fissure, while that under the pubis serves as a point of support, and ought to be raised by the obstetrician towards the abdomen (*plate 16, fig. 2, 3*). As soon as the shoulders are expelled, the body generally follows with rapidity, in an oblique direction, to the genital aperture, and not from pubis to sacrum (*plate 17, fig. 1*). The hips of the infant are adapted with mathematical precision to the long diameter of the brim, on either side, and also rotated, like the head and shoulders, in the cavity of the pelvis, by the planes of the ischia, so that one hip escapes towards the sacrum, the other under the pubis; the longest diameter of the infant being here also adapted to the longest of the maternal bones or pelvis (*plate 17, fig. 1*).

Thus it appears that the human offspring comes into the world, its most voluminous parts, head, shoulders, and hips being adapted to the widest of those of the female parent. It is most essential to comprehend clearly the mechanism of natural parturition; for, without a knowledge of it, no practitioner can assist or operate with safety or satisfaction in the numerous difficult cases that frequently present themselves, every one of which, except the Cæsarian section and other cutting operations, is managed in strict imitation of the process of natural labour.

Second Position.—The relative positions of the infant and parent are the same as the last, but in an inverse direction.

The upper and fore part of one of the parietal bones is the presenting part, according to professor Nægelé, and the head descends obliquely into the pelvis. The round and bulky vertex or crown of the head, and one tuberosity of the parietal bone, are next directed against the inclined plane formed by one of the spines of the ischia, by which it is guided forward to the adjacent acetabulum; while the less bulky, but smooth forehead, is by the same motion passed obliquely backwards, towards the sacro-iliac symphysis. The head is now turned into the first position. M. Nægelé, of Heidelberg, observed this mechanism in ninety-three out of ninety-six cases. In some rare instances the vertex is turned towards the sacrum, while the upper and anterior part of one of the parietal bones passes under the arch of the pubis, constituting a facial presentation to the pelvis (see *plate 22, fig. 1*).

Third Position. Principal Relations.—In this position the occiput instead of the forehead corresponds to the right sacro-iliac joint, or symphysis, and the forehead to the left acetabulum, or cotyloid cavity. The posterior region of the infant is directed backwards and to the right, the anterior forwards and to the left.

The head at the superior strait is flexed or bent on the chest, and the occiput descends into the cavity of the pelvis. Arrived at the inferior strait, the head encounters the inclined planes of the ischia, which impress upon it a rotatory motion; the occiput glides on the right lateral and posterior inclined plane, so as to place itself in the curvature of the sacrum, whilst the face glides on the anterior and left lateral inclined planes, so as to come under the arch of the pubis (*plate 22, fig. 1*). The occiput now receives all the contractions of the uterus; it passes over the sacrum, coccyx, and perinæum, while the face ascends in the pelvis, and is depressed on the chest.

As soon as the occiput begins to appear at the vulva, or external genital aperture, this part is dilated during every pain, and contracted when the pain ceases, so that the occiput reascends into the cavity of the sacrum. Finally, the resistance of the external genitals is overcome, the occiput or back of the head passes into the world along the inferior axis of the pelvis, and the face escapes from under the arch of the pubis. This is the inverse of natural labour (*plate 15, fig. 2*).

The occiput now corresponds to the posterior and internal part of the right thigh, and the face to the left groin (see *plate 16, fig. 1*).

The shoulders are obliquely engaged at the superior strait, and pass into the cavity of the sacrum. Arrived at the inferior strait or outlet, they encounter the inclined planes, which impress on them a rotatory motion.

The right shoulder is turned into the curvature of the sacrum, the left is placed under the arch of the pubis. The head now changes its relations; the face looks to the middle part of the left thigh, and the occiput to that of the right thigh (see *plate 16, fig. 1, 2, 3; plate 17, fig. 1, 2*).

The lower shoulder, which is towards the sacrum, receives all the

contractions of the womb, whilst that which is under the pubis is a point of support.

When the shoulders are expelled, the rest of the body passes without any difficulty, the hips of the infant being turned in the long diameters of the brim, cavity, and outlet of the pelvis, as in the first position. This presentation may be often reduced to the second.

Fourth Position. Principal Relations.—The occiput corresponds to the left sacro-iliac symphysis, the face to the right acetabulum or cotyloid cavity. The posterior region of the fœtus is directed backwards and to the left, the anterior region forwards and to the right. The feet are towards the fundus, or upper part of the uterus.

Mechanism.—The mechanism of the fourth position is the same as the third, except that the rotation and progress of the infant are in an inverse sense. This position may be naturally converted into the first.

The most frequent positions in natural labour are the forehead to either sacro-iliac symphysis, when the face is finally turned into the hollow or cavity of the sacrum, though sometimes the forehead, face, or ear may be the presenting part.

NATURAL PARTURITION BY THE ABDOMINAL EXTREMITY OF THE FŒTUS—PEDAL PRESENTATIONS.

Positions of the Feet.—The feet present in four principal positions, which correspond to the oblique diameters of the brim of the pelvis. The fœtus is placed in these positions in such a manner that the thighs are bent on the pelvis, the legs on the thighs, and the heels are applied to the breech.

First Position. Principal Relations.—The heels correspond to the left cotyloid cavity (acetabulum), the toes to the right sacro-iliac symphysis.

The posterior region of the fœtus is directed forwards and to the left, the anterior backwards and to the right.

Mechanism.—Pressed by the contractions of the uterus, the feet descend with facility into the cavity of the pelvis, and through the outlet. The breech encounters the inclined planes, is rotated, and the left hip is placed under the pubis, and the right is in the concavity of the sacrum.

The longest diameter of the infant's pelvis, which is from hip to hip, as already stated, is first adapted to the oblique or longest diameter of the brim, then to the cavity, and lastly, to the antero-posterior, coccy-pubic or long diameter of the outlet (see *plate 23, figs. 1, 2*). This adaptation does not always occur, as when the maternal pelvis is very large; in which cases the breech may escape, or come into the world transversely, each hip being turned to those of the mother.

The inferior hip of the infant, which is towards the perinæum, receives all the contractions of the womb, escapes first, whilst that under the pubis is a point of support (see *plate 23, figs. 1, 2*). The body is now in the oblique diameter of the brim, and gradually turns its anterior surface towards the sacrum or spine of the woman (see *plate 23, fig. 3*, and *plate 24, fig. 1*). The shoulders are engaged obliquely in the brim

or superior strait, are next turned towards the hips of the mother, and the arms are placed on the sides of the head (see *plate 24, figs. 2, 3*). The head and axillæ pass in the oblique diameter of the brim, then into the cavity, and, lastly, into the long diameter of the outlet. The arms now escape, and the head is expelled.

Thus the head is engaged obliquely at the superior strait, and the chin is flexed on the chest. Arrived at the inferior strait, it undergoes rotation, the face is turned into the cavity of the sacrum, and the occiput is placed under the arch of the pubis (see *plate 25, figs. 1, 2*).

The chin courses along the concavity of the sacrum, coccyx, and perinæum, and presents at the vulva. The different parts of the face traverse the sacrum, coccyx, perinæum, and escape at the inferior commissure or angle of the vulva; the forehead, crown of the head, and occiput follow on the same parts, and the back of the head is born last, inverse to natural labour (see *plate 2, fig. 2*; *plate 16, fig. 1*).

In pedal presentations the obstetrician should imitate nature, and during the birth of the head, he ought to support the body of the infant on the left arm, introduce the fore-finger of the left hand into the mouth, to depress the chin on the chest, and raise the back of the infant towards the abdomen of the mother, as delineated in *plate 25, figs. 1, 2*; so that the back of the infant will be placed on the abdomen of the mother, and the face and head will escape in the manner just mentioned. An ignorant obstetrician makes traction of the infant downwards and backwards, draws the chin against the sacrum, coccyx, and perinæum, and cannot possibly extract the head in this direction. The evil results of this bad practice are, the destruction of the infant, the infliction of severe and unnecessary pain upon the mother, the injury of the sacro-coccygeal articulation, or dislocation of the coccyx, the contusion or laceration of the perinæum, more especially its vaginal aspect, and sometimes the separation of the body of the infant from the head, the latter being left in the pelvis. In the course of my practice, I have been consulted in examples of each of these diseases, induced by ignorant obstetricians, both male and female. Such persons suppose that when the body of an infant is expelled by nature, the head, which is so much smaller in appearance, ought to follow without difficulty or delay; and this induces them to make traction *downwards and backwards*, that is, in the wrong direction, instead of *upwards and forwards*, towards the abdomen of the woman (*plate 2, fig. 1*; *plate 16, fig. 1*).

Second Position. Principal Relations.—These are in exactly an inverse sense to those of the first position, just described.

Third Position. Principal Relations.—The heels correspond to the right sacro-iliac symphysis; the toes to the left cotyloid cavity. The posterior region of the infant is directed backwards and to the right, the anterior forwards and to the left. The head is at the fundus of the uterus.

Mechanism.—The mechanism of this presentation scarcely differs from the first position, as the same parts of the foetus are found to correspond to those of the pelvis of the mother, the largest parts of the one being adapted to those of the other.

Thus the feet, pressed by the contractions of the uterus, descend

without difficulty into the cavity and outlet of the pelvis. The breech is rotated by the inclined planes, and has one hip turned towards the pubis of the mother, and the other to the perinæum, or passes transversely through the outlet when the maternal pelvis is large, and also when the foetus is small or premature.

The shoulders are engaged obliquely at the brim, and descend into the outlet, one being towards the pubis of the mother, the other towards the perinæum. The head is engaged obliquely in the brim of the pelvis, the chin is flexed on the chest, and after the normal rotation, so often mentioned, the occiput is turned into the curvature of the sacrum, whilst the face is placed under the pubis.

The occiput traverses the sacrum, coccyx, and perinæum, whilst the face ascends into the pelvis; the neck is pressed against the inferior commissure or angle of the vulva, and is pushed downwards; the face disengages itself under the pubis, and the occiput is born last.

Fourth Position. Principal Relations.—The feet correspond to the left sacro-iliac symphysis, the toes to the right cotyloid cavity. The posterior surface of the foetus is backwards and to the left, the anterior forwards and to the right. The head is at the fundus of the uterus.

The mechanism is the same as in the third position, but in an inverse sense.

This fourth position may be readily converted into the first.

POSITIONS OF THE KNEES. Principal Relations.—The knees may present, like the feet, in four positions. The legs are flexed on the thighs, and these are extended on the pelvis (see *plate 25, fig. 4; plate 26, fig. 3*).

First Position. Principal Relations.—The anterior part of the legs corresponds to the left cotyloid cavity, the anterior part of the thighs to the right sacro-iliac symphysis. The posterior region of the foetus looks forwards and to the left; the anterior backwards and to the right.

Second Position—Is the reverse of this.

Third Position. Principal Relations.—The anterior part of the legs corresponds to the right sacro-iliac symphysis; and the anterior part of the thighs to the left cotyloid cavity. The posterior region of the foetus looks backwards and to the right; the anterior forwards and to the left.

The Fourth Position—Is the reverse of this.

The mechanism of the knee, or genual presentation, is exactly the same as those of the feet.

POSITIONS OF THE BREECH are the same as those of the feet or knees, unless that the breech presents first (see *plate 26, fig. 4*).

It is essential to remember, that the hips of the infant ought to be adapted to the long diameters of the brim and cavity of the pelvis, and turned to the pubis or abdomen, and sacrum or back of the mother, when passing through the outlet, as already stated in describing the mechanism of presentations of the feet. It is in this relative position that nature places the hips of the infant in natural labour, as already stated.

The breech may present with the abdomen of the infant to the back of the mother, or the reverse, the abdomen of the infant to that of the mother, or either hip of the infant to the sacro-iliac joint of the mother, or either infantile hip to the ilium of the mother, or in the transverse

diameter of the brim of the pelvis. In all these cases the practical precept is to turn the hip of the infant to either sacro-iliac joint of the mother at the brim of the pelvis, and to the pubis and sacrum at the outlet, thus adapting the long diameter of the infantile pelvis to that of the maternal.

Some obstetricians advise that the abdomen of the infant should be turned to the back of the mother, or that as soon as the body is expelled in the opposite position, the abdomen of the infant should be turned to the back of the mother, because the arms and head pass more readily in this position.

When the body is extracted as far as the ribs, and the navel cord drawn down, the abdomen of the infant ought to be turned to the back of the mother, and the arms brought down as already described (see *plate 24, fig. 2*). If the abdomen of the infant is turned to that of the mother, there will be great difficulty experienced in extracting the arms, as in such case the elbows will be turned towards the sacrum, and much danger of injuring or dislocating the shoulder joints, or fracturing the arm bones; while the occiput of the infant will be in the concavity of the sacrum, the face to the pubis, and extraction rendered much more difficult than in the opposite relations of these parts (see *plate 21, figs. 1, 2, 3*).

When the face of the infant is allowed to descend towards the abdomen of the mother, which ought to be prevented in all cases, it should be turned into the hollow of the sacrum, if possible. But in some of these cases, the head is extended, the occiput is depressed on the nape of the neck, and the vertex turns into the hollow of the sacrum. The chin rests on the pubis, and the occiput passes out first inferiorly, though sometimes the chin may be extracted first, superiorly.

It is important to notice in this place, a class of presentations which are usually and properly termed preternatural, although in some extreme instances nature may effect delivery, but with great suffering to the woman, and almost certain death to the infant at the full period of pregnancy. These are presentations of the superior extremities or side of the body (*plates 25, 26, 27, 28*). In these cases, the infantine body is across or transverse to the superior aperture of the pelvis, the head towards one ilium, and the breech towards the other. It must be obvious, from what has been already stated, that great obstacles oppose delivery in this position. But in some rare cases at the full time, when the foetus is small, or premature, or rendered more pliable by decomposition, it may be spontaneously expelled by the power of the uterus alone, which led Dr. Denman to designate the process Spontaneous evolution; and its mechanism was first accurately described by Dr. Douglas, of Dublin. It is as follows:—the head rests on one iliac fossa, the shoulder is forced through the outlet of the pelvis, and rises before the pubis, thus making room for the expulsion of the side of the chest through the genital aperture; this last part is followed by the protrusion of the side of the abdomen; the body is now very much flexed upon itself, and the breech is finally, by strong and repeated efforts, forced into the sacrum, and at last externally through the vulva, as in breech presentations. The body, arms, and head follow, and may be expelled

by natural efforts alone, but artificial aid is often necessary. Though nature may very rarely effect delivery in such cases, there is no obstetrician, in my opinion, justified in cases of transverse presentations in waiting for spontaneous evolution, for the reasons above stated. The modern and best practice is to turn the infant, or bring down the feet in the direction of the first position already noticed. The infant may pass by spontaneous evolution in abortions and premature labours before the seventh month, when its size is comparatively small compared to that at the full period of pregnancy, but very rarely at the end of the ninth month. I have been informed that an infant was expelled at the full time, the head being turned backwards on the shoulders, and the neck the presenting part; but such a case must be of extremely rare occurrence, for I have never found it recorded by any ancient or modern author. When we consider the simultaneous birth of two infants, as the Siamese twins, or Hungarian sisters, or a more recent case which happened a few years since, at Exeter, we must be astonished and amazed at the marvellous power of the Author of nature, and may admit the possibility of the case to which I have just alluded.

On two occasions, where version or turning could not be accomplished, I succeeded in bringing down the breech, with the blunt-hook and crotchet (see *plate 40, fig. 4*); and in two other instances had to eviscerate the thorax and abdomen (see *plate 40, fig. 3*), dislocate and lacerate the spine, divide the body at the superior part as regards the presentation and position, before I could succeed in extracting it. Such operations should be performed when the infant is dead, and it will be speedily killed by pressure in this case, to save the life of the mother, and not allow her to die undelivered in transverse presentations, when version cannot be accomplished (see *Version or Turning*). In one case in which I successfully performed this operation, it was a tenth labour; all the former were natural, and attended by midwives, and the arm presented. All other means had failed. The woman recovered, is now alive, and fourteen years have elapsed since the operation.

Some obstetricians recommend, in breech or footling cases, extraction of the arms, when one is towards the sacrum, and the other towards the pubis after the birth of the body; and advise the lower extremity to be extracted first. This is accomplished by passing the index and middle finger over the shoulder next the perinæum, along the arm to the elbow, and drawing this forward; but I believe this operation is much more difficult than the former, and is rarely attempted in this country. The shoulders descend obliquely through the brim of the pelvis in breech or footling cases, to facilitate the advance of the head in the oblique or long diameter; but when the head descends into the cavity of the pelvis, the face is turned into the hollow of the sacrum, the ears are towards the hips, the arms over the sides of the head, and transverse to the outlet, and in this position are extracted (*plate 24, figs. 2, 3*).

It is to be remembered that the axis of the human body is perpendicular, or falls on the symphysis of the pubis, while that of the brim of the pelvis is represented by a line passed through the umbilicus (navel), and continued to the apex of the sacrum, or sacro-coccygeal joint, or apex of the coccyx according to some obstetricians (see *plate 2*,

fig. 1, e e e). I have already stated, that it would be an error to assert, that the axis of the brim of the pelvis is a right line passing through the centre of that aperture, as the brim and outlet look towards the anterior surface of the body (see *plate 2, fig. 1*).

It is therefore manifest that the axes of the brim, cavity, and outlet of the pelvis form a curved line, as represented in *plate 2, fig. 1, h h h h*). The practical inferences from these facts are, that a body passing into the brim of the pelvis, must advance *downwards* and *backwards* (*e i e*); when in the cavity, *downwards* and *forwards* (*g i g*); and when in the outlet, *forwards* and *upwards* (*i i i i d*). It is for this reason that the scientific practical obstetrician makes traction in these respective directions, according as the foetal head is in the brim, cavity, or outlet of the pelvis; while the ignorant operator endeavours, unsuccessfully and dangerously, to extract the head, feet, or body of the infant, no matter how situated in relation to the pelvis, by always drawing them *downwards* and *forwards*, against the apex of the sacrum or coccyx, and thus hooking the chin, or other descending position of the foetus, upon these parts. It is therefore obvious, that he can never succeed in effecting delivery in these directions; he contuses the many important organs and soft parts in the pelvis, generally destroys the infant, and frequently the mother (*plate 3, fig. 2; plate 12, fig. 1*).

It is also important to state, that the posterior part of the pelvis supports the weight of the body, while the anterior is an arch or buttress. The weight of the body, and superior extremities, is transmitted by the spinal column to the sacrum, then along the iliac bones, and finally to the pubis, all of which parts press with more or less force on each other. One of these arches receives the weight of the body; the other transmits it to the inferior extremities by the acetabula, sockets for the heads of the thigh-bones, or cotyloid cavities. (Denman, Desormeau, Velpeau, &c.) The practical inference from this physiology is important, viz. that separation of the sacro-iliac (*plate 1, fig. 1, c c*), or pubic joint (*d d*), must greatly impede locomotion, and prevent the sufferer from assuming the erect posture (see *plate 15*).

MALFORMATIONS OF THE PELVIS—DEFORMITIES—DIFFERENCE OF THE PELVIS RELATIVE TO AGE, SEX, AND SPECIES—CAUSES OF VICES OF CONFORMATION—MODES OF DETECTING DEFORMITIES—PELVIMETERS—ENUMERATION OF DEFORMITIES AND THEIR MORBID EFFECTS—PRACTICAL INFERENCES.

Of the Difference of the Pelvis relative to Ages, Sexes, and Species.—The pelvis is very straight and elongated at birth, its crest is marked, and the ilium is almost vertical; the cavity of the pelvis is conoid, and not excavated. The lateral diameter is shorter than the sacro-pubic. The pelvic bones are not perfectly ossified, a wise provision of nature, but covered with cartilages, to allow of reduction of this cavity by pressure of the infant during delivery, when it descends by the feet or breech (see *plates 23, 24, 25, 26*). The pelvis becomes more and more ossified during childhood, and is completely ossified about the fifteenth or twentieth year.

Osteology of the Pelvis.—The pelvis in the male preserves its infantile properties, its diameters are the reverse of the female, it is deeper than in woman, its short or sacro-pubic diameter is not more than three inches, the transverse or bis-iliac, measures four and a half, and the bis-ischiatic three and a half. The arch of the pubis is short and triangular, not expanded as in the female, to allow the emergence of the foetal head at birth. The sacrum is less hollow, the bones are thicker and stronger in general, and more solid.

The whole pelvis is less bulky, but more capacious and shallower, in the female than in the male; differences which show great wisdom in the design, by favouring the development of the gravid uterus, and facilitating the birth of the infant. I have already hinted at this fact in the second paragraph in page 17.

I may here observe, that it would be physically impossible for an infant of full growth to pass through the male pelvis; and hence the absurdity of the old fictions that the same hermaphrodites were fathers and mothers on different occasions. There never was a perfect human hermaphrodite; and the reputed instances mentioned in the dark ages, and republished in some of the treatises on *Medical Jurisprudence*, are wholly unworthy of credence.

The pelvis of *the female* is broader at the hips, as well as in every other part, than that of the male; and here nature seems to have sacrificed the facilities of motion to the advantages of pregnancy and parturition. The articulations of the female are not ankylosed; while they are firmly ossified in the male.

The pelves of the lower classes of animals differ materially from those of the human species, and these are so wisely constructed that brutes require no aid, and suffer little pain in bringing forth their young. In these animals there is but one axis in the pelvis, the sacrum is almost parallel with the spine, the superior and inferior straits or apertures are only slightly inclined; the parietes are of equal depth and of the same length; the ossa innominata are so straight and elongated that there are slight iliac fossæ; and hence expulsion of their young is not exposed to the same difficulties as in the human species. The weight of the foetus is on the abdomen in most quadrupeds, and not in the axes of the brim, cavity, and outlet, as in the human female, and hence there is no necessity for reversing the diameters or axes.

There is a vast variety in the pelvic structure of animals, which, as we gradually ascend the zoological scale, becomes insensibly more perfect. Thus the pelvis of the monkey and ourang outang have a strong resemblance to that of the human species; and we can trace the shades between these and the Boshiemans, who are considered by some to be the connecting link between monkeys and man, the Ethiopians, Negroes, Malays, Japanese, and Caucasians, the last of whom are most different from the other mammiferæ; and thus, we perceive, that parturition is more painful as the species is more perfect, and *vice versâ*: a most admirable and singular provision of nature, that the dangers are increased and most accumulated, according to the perfection and degree of intelligence of the animal. Again, in the kangaroo and other species of marsupia, the pubis is loose; while the pelvis is so narrow in the mole

as to prevent the passage of the young, unless it were separated before or during parturition. In the cetaceæ there is scarcely a vestige of it; and in birds, reptiles, and fishes which lay eggs, we observe it gradually becoming imperfect, and finally to disappear. (Wrolick's Essay on the Diversity of Pelvis, Bull. de Sciences Med. Fev., 1827. Velpeau, 1835).

Of the Deformities of the Pelvis.—The pelvis may be deformed in its brim, cavity, and outlet, and may offer serious impediments to the passage of the infant, or render delivery dangerous, difficult, or impossible, without the aid of art (*plate 34, figs. 4, 5, 6, 7, 8*). It may, on the contrary, be too capacious, or possess excess of amplitude, thereby affording too ready a passage to the foetus. In the latter case, delivery may suddenly take place, often unexpectedly, and in extraordinary situations, as in the highway, in the stage-coach, in the water-closet, night-chair, or in the sitting-room, before the woman can retire to her bed-chamber. The various obstetric works afford ample evidence of this fact, and it is even occasionally attested by the public press.

When the pelvis is unusually capacious, it causes a great number of inconveniences besides those already noticed. In such cases, the uterus during gestation is not properly supported, may be retroverted, or anti-verted, or may not rest on the iliac fossæ, and be prolapsed or even protruded beyond the external genital aperture.

There was a woman under my care at the Western Dispensary, Westminster, in 1836, who was in the sixth month of pregnancy, and whose uterus protruded externally when she assumed the erect position. There is now, June 1839, a similar case under my care at the Metropolitan Free Hospital, and the woman is aged twenty-one years, and is six months pregnant. The gravid uterus protrudes between the limbs, when she walks or makes exertion, and a large pessary is required to keep the organ in its natural situation.

In some cases the pelvis is smaller than that of the natural standard one, whose dimensions have been already given; and should the foetus be disproportionably large, it is obvious that the labour will be difficult, as if the passage was morbidly diminished in size. This often occurs when slight and spare women have large infants; and artificial aid becomes necessary. I have elsewhere described the bad effects of great difference in stature of parents, and those about to form matrimonial contracts.—(PHILOSOPHY OF MARRIAGE IN ITS SOCIAL, MORAL, PHYSICAL, AND MEDICAL RELATIONS. Third edition, 1839.)

A large pelvis not only favours the descent and displacement of the womb, but also the rapid termination of parturition, and is consequently predisposed to all the accidents subsequent to sudden delivery, as hæmorrhage, syncope, prolapse or falling down of the womb, reversement or “turning inside out” of the uterus, of which Levret observed several examples. These accidents have been exaggerated, according to Mad. Lachapelle, M. Velpeau, and others, who state that the sudden expulsion of the infant, and of the placenta, and the rupture of the navel cord, very rarely occur in such cases, and this accords with my own experience and observation. (See Prolicide hereafter).

Causes of the Deformities of the Pelvis.—Observation abundantly proves, that the pelvis in many women retains the form which charac-

terized it during infancy and puberty, and which nearly approaches to that of the male. In fine, every part of the true and false pelvis may be deformed, and diminished in capacity. In some cases the ossa innominata nearly approximate; in others, the pubis approaches within half an inch of the sacrum. (Weideman, Boivin, Jeuffrion, Maygrier, C. Bell, Nægelé, Velpeau, Barlow, &c., *plate 34*, illustrative of craniotomy).

The inferior strait may be so considerably diminished, that the coccyx will nearly rest upon the pubis, and the ischia approximate towards each other very closely; and there may be every degree of deformity between these extremes. Exostosis may form upon any of the bones of the pelvis, and an immense variety of tumours may be developed in the vagina and internal or external genitals, which may greatly impede parturition. The method of detecting deformities will be described after an account of their causes.

Of the causes of Vicious Conformations of the Pelvis.—To appreciate the causes of the malformations of the pelvis, we should examine them in infancy, at puberty, and at the adult age. During the first seven years, rickets will in general afford the explanation. When we admit that the softness of the bones prevails throughout the body in rachitis, it is clear that if the infant is placed too soon or too much upon its legs, the base of the sacrum must approach towards the pubis, and the acetabula must be directed towards the promontory of the sacrum; the morbid effect of which is, that the sacro-pubic and oblique diameters will be diminished. When the infant leans too much upon one lower extremity, which is sometimes the case, the oblique diameter of one side will be contracted; when it is allowed to sit too much, at a tender age, the concavity of the sacrum becomes deeper, and the antero-posterior diameters of the superior and inferior straits are diminished; and if it is placed continually on the back, the concavity of the sacrum disappears, so that the sacro-vertebral junction or promontory, and the coccy-pubic diameter, lose their ordinary dimensions, and the transverse diameter will also be affected. It is likewise to be recollected how imperfectly the bones are ossified in cases of rickets, and therefore how much they must be influenced by the action of the many powerful muscles attached to the pelvis, especially of those connected with the coxo-femoral articulation or hip-joint.

The deformities of the pelvis are chiefly caused by partial or general malacosteon, or mollities ossium, or osteomalaxia, the irregular action of muscles, and the bad position of attitude. Women who labour under such diseases, have generally the head and pelvis thrown backwards, and can never become mothers without the risk of great danger. I need scarcely observe, that in cases of amputation at the upper third of the thigh, or at the hip-joint, deformity of the opposite side of the pelvis will occur, because the whole weight of the body will be principally placed upon the sound extremity. Fractures, when irregularly ossified, luxations, caries, and syphilis, often give rise to deformities, and cause serious obstacles to delivery. In conclusion, I may state, that rachitis is the cause of pelvic deformity in young infants; and after the age of puberty, the chief cause is osteomalaxia affecting the vertebral column,

producing spinal curvatures, which cannot exist to any great extent without affecting the pelvis very considerably. This fact is attested by the various standard writers on spinal curvatures.

In France, and other European nations, it is usual to ascertain the extent of pelvic deformity by instruments called pelvimeters; but as such are never employed in this country, a slight allusion to them will be sufficient. The fact is, that deformities can be ascertained much more correctly with the finger than with any pelvimeter.

As a general rule, it may be maintained, that those women affected with great pelvic deformity ought to avoid becoming mothers. The dimensions of the pelvis can be readily ascertained on the bones of the skeleton, but with difficulty on the living subject. Instruments called pelvimeters have been invented to facilitate the acquirement of the desired information. The pelvimeter of Coutouley is a kind of compasses, one extremity of which is placed on the pubis, and the other on the sacrum; and the distance between them is measured with a rule. This contrivance cannot be depended upon, because there may be exostoses and great deformity in the cavity of the pelvis, which cannot be detected by it. To remedy its defects, M. Baudelocque proposed an improvement, which he called a *callipers*. This resembles a shoemaker's measure, or rule, one extremity of which is to be introduced into the vagina, and placed against the promontory of the sacrum; while the other is applied on the symphysis pubis, externally, so that the space between the two points of contact is considered the extent of the sacro-pubic, antero-posterior, or short diameter of the brim of the pelvis. Such contrivances are never employed by British obstetricians, who prefer the introduction of one or two fingers, by which they acquire much more correct information. When the fingers are passed into the vagina, in most cases, they may be readily carried to the promontory of the sacrum, and round the cavity of the pelvis, so that the length of the antero-posterior, oblique, and coccy-pubic diameters may be ascertained. We can also discover by this exploration, the existence of any contraction or deformity of the pelvic bones, or of the many soft tumours which diminish the natural capacity of the pelvis.

M. Velpeau prefers this method of mensuration or pelvimetry, and is no advocate for the use of the various ingenious but imperfect contrivances of his fellow-countrymen. He holds that the compasses of Baudelocque, and the *cephanometer* of Stein, are the most useful pelvimeters. He also informs us, that the use of the *necometer* of Chaussier is confined to the Maternity in Paris, and that the *intro-pelvimeter* of Mad. Boivin does not differ very much from the instrument of Coutouley. But there is one great objection to all these instruments, which is this, that the quantity of fat, the size of the lumbar and gluteal muscles, and the thickness of the pelvic bones, must render the mensuration by pelvimeters very uncertain, and rarely, if ever, to be depended upon.

A tolerably accurate idea may be formed of the dimensions of the pelvis, by examining the bones externally, with the hand, and even over the inner garment. Such an exploration will be required when we are consulted by anxious mothers, as to the safety or prudence of allowing their daughters to enter into conjugal engagements. I need scarcely

observe, that such examinations ought always to be made with the greatest modesty and circumspection. It is not necessary that the woman should lie in bed, or her dress be removed, though it ought to be loosened; she may sit or lie on a sofa.

If she is well formed, the hips broad, and wider than the base of the thorax, the great trochanters widely apart, the sacrum not too flat or convex, the symphysis of the pubis not too depressed or prominent, we may infer that she possesses natural conformation. By placing the fingers on the symphysis pubis, and barely within the external labia, and carrying them along the arch and descending branches of the pubis, we can easily ascertain whether the arch is contracted, or forms a sufficiently large circle for parturition; and also if the ischia are sufficiently distant from each other. It is also well to recollect, that the width between the hip-bones is double that of the superior aperture of the pelvis (see *plate 1, figs. 1, 2*).

But when the hips are unequal, one being higher than the other, and the external iliac fossæ depressed, there is some degree of diminution of the bis-iliac, or transverse diameter of the brim. The approximation of the ischia, the convexity of the sacrum, and the inclination of the coccyx forwards are easily recognized. It is often essential to the happiness of families to arrive at correct conclusions on this subject. Consultations on this question are not of frequent occurrence; but every medical practitioner is bound to be competent to give a correct opinion.

The first case in which I was consulted, after obtaining a medical and surgical qualification, was one of this kind, in which a former classical tutor of mine felt deep interest. He was most anxious to know whether it was possible for a lady with excurvation of the dorsal spine to become a mother with safety; and I replied, after careful examination, in the affirmative. She is now the mother of several children.

I have also to observe, that the contractions of the pelvic bones are most frequent at the superior aperture, inlet, or brim of the pelvis; next in the oblique diameters (Velpéau), and more commonly in one than the other. Contraction of the bis-iliac or transverse diameter is the rarest of all, and is scarcely ever observed alone. The contraction of the antero-posterior, or sacro-pubic diameter of the brim of the pelvis, may be caused by projection of the promontory of the sacrum, or arch of the pubis; and in such cases the superior aperture of the true pelvis, inlet, or brim, is cordiform (heart-shaped), or reniform (kidney-shaped). When the symphysis pubis is depressed backwards, the brim of the pelvis assumes the form of the figure of 8 (see *plate 34*).

When both oblique diameters are deformed, the superior branches of the pubis may, independently of the symphysis, so approach the promontory of the sacrum, as to form a triangle, or a trapezium, so that the extremities of the bis-iliac diameters form angles more or less acute or obtuse. Such pelves have been denominated *trilobate* or *trifoliate*, but with this peculiarity, that although the three segments are generally equal, at other times, the right, left, or anterior is smaller than the other two (see *plate 34*, illustrative of craniotomy).

In some cases the pubic bones so nearly approach to the sacrum, that

the antero-posterior diameter of the brim does not exceed two inches and a half. (Jeuffrion, Maygrier, &c.)

When one oblique diameter is deformed, the other is generally enlarged, according to Smellie, Stein, &c. But it rarely happens, unless when the sacrum is implicated, that the bis-iliac or transverse diameter of the brim is much contracted, or impedes the progress of the infant. There is, in general, a space of four inches between the iliac fossæ. This deformity causes a roundness of the sacro-pubic diameter, and gives to the superior aperture an oval form, or that of an elongated heart.

In some cases, the contraction is confined to one side of the brim of the pelvis. Sir Charles Bell described the pelvis of a woman affected with osteomalaxia, in which the antero-posterior diameter did not exceed three lines, and the space between the iliac fossæ was only half an inch. Nægelé gives the case of a woman, the mother of six infants, who suffered from osteomalaxia, in whom there were but two lines on the left, and six on the right side, between the fourth lumbar vertebra and the superior margin of the symphysis pubis. It is always to be recollected, that there are all degrees of deformity between these now mentioned and the natural dimensions of the brim of the pelvis.

The *outlet* or *perineal aperture* is occasionally contracted, but very rarely when compared to the abdominal or superior. Some maintain the inferior aperture is more frequently enlarged than contracted. When the pubis approaches the sacrum, or *vice versâ*, the coccyx and pubis will be more or less separated from each other. In fact, it may be maintained, as a general proposition, that the inferior aperture or outlet of the pelvis is enlarged when the superior is contracted, although it is possible that both may be simultaneously deformed. The approximation of the ischia, and the triangular form of the pubic arch, may offer great impediments to parturition.

The coccyx may be retroverted or horizontal, and in the latter state very considerably diminish the long diameter of the outlet. In some cases one ischium projects more or less into the outlet, while its fellow and the coccyx retain their normal position. In fine, the deformities at the perineal or inferior aperture of the pelvis are as numerous, though less frequent, than those of the superior. It is also important to observe, that the vices of conformation of the cavity of the pelvis are greatly modified by those of the superior and inferior apertures or straits, and generally coexist with them. They are caused by excessive curvature of the sacrum, or when it is not sufficiently concave, or when there is some osseous prominent point on the parietes.

In the first case, the sacro-pubic and coccy-pubic diameters are contracted, whilst the antero-posterior diameter of the cavity is very much increased. At other times, though strongly curved, the sacrum is not less separated from the pubis, either by its base or apex. In the second case, the anterior face of the sacrum is flattened; and the cavity of the pelvis may be contracted or enlarged.

When the sacrum is too concave, and the superior and inferior apertures are contracted, the head remains so compressed or locked, that the forceps, craniotomy, or even the Cæsarian operation may be required.

When it is too flat, the head descends with unusual rapidity, and may be arrested at the outlet. Both apertures of the pelvis may be deformed simultaneously, or one much more than the other. When the arch of the pubis projects inwards to the extent of an inch or more, the pressure of the infantine head must contuse or lacerate the bladder and rectum, causing sloughing in a few days after delivery, and often inducing vesico-vaginal, or recto-vaginal fistula. Lastly, the cavity of the pelvis may be deformed by the inward projection of one acetabulum; examples of which were treated by Levret, Barbaut, Lachapelle, and others.

Osseous and other tumours may likewise diminish the admeasurements of the brim, cavity, and outlet of the pelvis. Examples of this class will be given in the description of dystocia or preternatural parturition. Suffice it to state at present, that exostosis may exist of various sizes in every part of the interior of the bones of the pelvis. M. Velpeau cites no less than twenty writers, and the records of medicine afford many times the number, who have described cases of this kind; some of the women died undelivered; others had the Cæsarian operation performed upon them, and the infants of more were craniotomised. (*Op. Cit.* 1835; see also *Burns*, ninth edition, 1837; *Barlow's Surgery and Midwifery*, 1822; *Lond. Med. and Surg. Jour.*, vol. iv., 1834).

When the pelvis is deformed, its axes and planes must necessarily deviate from their natural directions (see *plates* 1, 2). Thus, if the sacro-vertebral angle approaches the pubis, the depth of the pelvic cavity will be increased. The angle formed by the sacrum and spine in a healthful subject is one of 175 degrees, but it may be reduced to 120. In such cases the axis of the superior strait or aperture is considerably inclined forwards, and sometimes approaches the horizontal line.

If the coccyx be fixed to the apex of the sacrum by the sacro-sciatic ligaments, or ankylosis, and does not yield to the regressive motion during parturition, the plane of the inferior strait is depressed under the horizontal line, and may even become parallel with that of the superior strait. This derangement does not approach the perpendicular aspect of the outlet of the pelvis, or incline backwards, as might be supposed on a first view; but is directed considerably forwards, because the anterior aspect of the coccyx determines the direction.

M. Bello described a very rare and curious case of deformity, in which the outlet or perineal aperture looked forwards, and the brim or inlet backwards. The pubis was turned upwards, and the convex surface of the sacrum was downwards. The body of one of the last lumbar vertebrae was wanting, and the sacrum united at its base nearly at a right angle with the spine. The deformity was so great as to require the Cæsarian operation. (*Trans. Med.*, tom. xiii.) I have a pelvis of this kind in my possession.

When the pubis is elevated, and the promontory of the sacrum is flattened, the axis of the superior strait approaches the vertical line, and sometimes the axis of the trunk. If, in such cases, the posterior surface of the cavity wants the curve, the superior and inferior axis may become parallel, although the plane of the inferior strait is strongly inclined forwards. This vicious conformation renders parturition extremely diffi-

cult, and favours laceration of the perineum. Lobstein was the first who directed attention to this deformity in 1807, and Velpeau has also well described it in 1835.

ORGANS OF GENERATION.

A concise description of these organs is necessary for the clear comprehension of natural parturition, and its influence upon them, as well as the injuries they may sustain by external violence, as in cases of female violation, also in disputed cases of virgin purity, pregnancy, &c.

The organs of reproduction in the human species are partly contained in the pelvis, and partly external to it. They are divided into *external* and *internal*.

OF THE EXTERNAL ORGANS OF GENERATION.

The *external organs of generation* in the human female are the *mons veneris*, the *vulva*, and *perinæum* (*plate 3, fig. 1*). Though these parts are secondary in the act of parturition, they may be exposed to much injury, which renders an exact account of them indispensable to the obstetrician.

The *mons veneris* is a fatty eminence, covered with hair after puberty, situated on the symphysis pubis, arising on each side from the groin, composed of common integuments, fibrous and cellular tissue, and a great number of sebaceous follicles (*plate 3, fig. 1, a a*). It is from an inch to two in breadth, and bifurcates inferiorly to form the labia externa (*d d*). It is more or less prominent, and in fat women is separated from the abdomen by a furrow, and forms a cushion of fat and cellular substance. It is sometimes the seat of phlegmonous inflammation, which is accompanied by acute pain, and is speedily followed by suppuration. We are seldom consulted when this part is inflamed, and usually find an abscess formed, which requires to be opened as promptly as possible.

Sonnini describes Egyptian women in whom a fleshy growth extended from the mons veneris over the external genital fissure; and a similar excrescence is also mentioned by Thevenot, and is common in the Hottentot women of the Cape of Good Hope. This deformity is very rare in Europeans; but an example was observed in a young girl at Arras in 1745, which was four inches in length, and covered with skin.

Labia externa majora Pudendi.—The labia or large soft lips arise at the termination of the mons veneris (*c c*), and descend to the perinæum anterius, and within an inch of the anus, where they are united. These consist of common integuments, cellular substance, and fat, are very distensible, and are covered with hair after puberty. Their internal surface is smooth, and of a rosaceous colour, covered with mucous membrane, with numerous mucous and sebaceous follicles, which sometimes give rise to a mild or an acrid irritating discharge, often mistaken for gonorrhœa. The points at which the greater or external labia are united, above and below, are called the *superior* (*b b*) and *inferior* (*k k*) commissure.

The labia are dense before puberty, and in apposition, and about three inches in length; after marriage they become elongated, separated, flaccid, and of a bluish colour, and lose their regularity. They sometimes grow together or become united in delicate children, who, from want of proper daily ablution, become ulcerated. There may be complete union between them, which will close the genital fissure except at the upper part, which is kept open by the frequent passage of the urine. I have repeatedly incised this union in girls before the age of puberty, and also in several children. This disease would impede menstruation, as well as consummation of marriage. Similar cases are recorded by most obstetric writers, as Mauriceau, Deventer, La Motte, Rconhuysen, Morgagni, and many others. When the labia are inflamed, the pain is excessive, suppuration takes place very rapidly, and the matter may be discharged in twenty-four or thirty-six hours, by poultices. According to Dr. Burns, the abscess ought not to be opened, as hæmorrhage will take place; while M. Velpeau recommends a deep incision in proper time, to prevent the formation of fistulous openings. My own experience accords with both the authors now quoted, as cases occur in which superficial or deep incisions will be necessary. The labia may be congested, anasarcous, greatly swollen, and the seat of hernia, or other tumours, which will be described hereafter.

The opening between the labia is called the *vulva*, *pudendum*, or *genital fissure*, or *sinus pudoris* (plate 3, fig. 1). It contains other parts: the *labia minora* or *nymphæ*, the *clitoris*, the *vestibulum*, the *meatus urinarius*, the *vaginal orifice*, the *hymen*, the *fossa navicularis*, and the *frænum* or *fourchette*. On separating the labia externa at the superior commissure, we see the *clitoris*.

The *clitoris* is an erectile, elongated organ (plate 3, fig. 1, *dd*), compared by some to the palate, composed of two cavernous, spongy, vascular bodies, about an inch in length, with erector muscles, and is inserted into the ischio-pubic branches. It resembles the penis, has a round free extremity, called its *glans*, which is enveloped by skin or *prepuce*, and terminates in the labia minora. A suspensory ligament attaches the clitoris to the pubis. In the first months of intra-uterine life, this organ is as voluminous as the penis, and is often mistaken for it; but at birth it is greatly diminished in size, and at puberty it is a small tubercle of about four lines in length. It sometimes increases to four or five inches in length in the adult, and then constitutes a form of hermaphroditism. It is highly sensitive, becomes erect during the excitement of coition, and is improperly said to be the chief seat of voluptuousness. It is not very liable to disease, though sometimes the seat of cancer and cauliflower excrescence. If elongated or diseased, it may be removed by excision. There are many cases recorded, in which emaciation, hysteria, leucorrhœa, and nymphomania were induced by artificial irritation of this organ, and for the removal of which, its excision was the only remedy. Saviard, Petit de Namur, Zacchias, Duval, Gaspar, Bauhin, Fodéré, Beck, and many other writers on medical jurisprudence, have given ample details of such cases, as also have the various medical periodicals of this and other countries. Such elongations are, however, rarely observed in temperate climates. The clitoris,

when diseased, has weighed nine pounds, and was successfully excised (Mollinetti, cited by Bonet, Macfarlane, *Med. Chir. Rev.* 1833, *Trans. of Provincial Medical Association*, 1836).

Behind the glans of the clitoris and between the nymphæ is a triangular space, about an inch in extent, called the *vestibulum*, which does not fulfil any function relative to generation (*plate 3, fig. 1, g g*). Celsus and Lisfranc have proposed to perform the operation of lithotomy on women through this space.

Posteriorly, and about half an inch from the symphysis pubis, is the *meatus urinarius*, or orifice of the urethra, a small round cavity, surrounded by slight depressions, called *lacunæ* (*plate 3, fig. 1, e e*). The female urethra is about an inch or an inch and a half in length, is capable of great dilatation, and subject to much injury during parturition. It is connected to the pubis by the ligamentum inferius vesicæ. It may be contused, lacerated, and often sloughs, forming an aperture into the vagina, termed vesico-vaginal fistula.

The relative position of the urethra ought to be known, to enable the surgeon to perform catheterism.

Introduction of the Catheter.—The orifice of the urethra is placed about an inch below the clitoris, and under the arch of the pubis. The position of the woman may be upon her left side or back; but sometimes in the sitting posture, the operator kneeling in front of the patient. I have known the operation performed in the erect position. The labia are to be separated with the index and middle fingers of the left hand, and the former is then passed along the pubis, and a little below it, when a small depression or tubercle will be felt, which is the orifice of the urethra. The catheter, dipped in oil, is now introduced with the right hand. It is to be recollected that the urethra runs along the symphysis pubis. If the finger be introduced into the vagina, and drawn along the pubic joint, the urethra is readily distinguished by its size, which is about that of the corpus spongiosum of the male urethra, and its orifice easily detected. There is scarcely ever a necessity of exposing the patient in performing catheterism. The operation may be required for several days after delivery. The urethra is sometimes discovered with difficulty when inflamed and enlarged after parturition, and in such cases only is exposure indispensable.

When the orifice of the urethra is detected with the fore-finger of the right hand, that of the left may be placed upon it, so that the operator may introduce the catheter with the right hand. He holds the instrument between the thumb and fore-finger, passes it along the left index finger forwards and upwards, when it will readily slip into the orifice of the urethra. The handle of the instrument should now be depressed, so as to raise its point, and when it is passed about two inches it is in the bladder, and on withdrawing the stylet or wire, the urine will flow freely. In difficult cases the left fore-finger may guide the instrument along the urethra.

The *labia minora*, or *nymphæ* are two continuations from the prepuce of the clitoris and labia externa, and have been compared to the comb of a young cock (*plate 3, fig. 1, f f*). They descend and diverge on the internal surface of the labia majora, and terminate insensibly about

the middle of these last. Their consistence is firm, their colour a pale reddish; they are formed by the fine, thin, vascular, and erectile tissue of the clitoris, and consist internally of adipose and cellular tissue. They pass at birth the level of the external labia; in virgins they are hidden by the latter; and in women who have had children, they again project, but lose their density and rosaceous colour. They are rarely elongated, naturally or accidentally, but in some countries, as Hindostan, Turkey, and Persia, they produce so much inconvenience as to require excision—an operation also occasionally performed in European nations. I have now a young lady under my care, who is in the sixth month of pregnancy, and whose nymphæ project beyond the labia, and cause great irritation when she walks. I have seen but six cases of the same description. Strabo states, that such operation was extremely common among the women of ancient Egypt; and that excision was required by almost all, on account of the inconvenience experienced in walking, riding, and sexual intimacy. Belon and other recent travellers also attest this fact. The disease is common in the torrid countries of Africa; and Leon, the African traveller informs us, that there are certain men and women who have no other occupation than practising excision or circumcision of the elongated nymphæ. He likewise states, that these persons cry loudly through the streets, at the same time looking at every woman, “Who wishes to be cut?” (See also the works of Eusebius, Herodotos, Avicenna, Zimmerman, Buffon, &c. &c.) The nymphæ are said to direct the stream of urine, and to increase venereal enjoyment.

The *hymen*, or *circulus membranousus*, is a thin, extensile membrane or muscle (Velpeau), formed by a doubling of the inner surface of the vestibulum, of a semi-lunar or crescentic form, its extremities or cornua ascending upwards to the sides of the urethra, where they unite (*plate 3, fig. 1, ii*). This membrane nearly closes the vulvo-vaginal or external genital orifice, leaving a small crescentic aperture superiorly for the escape of the menses. This opening is absent occasionally; and in other cases the hymen is cribriform or imperforate. This part was long considered a proof of virginity by the vulgar, the magistrates, and medical jurists, and often led to very erroneous and unjust decisions by the tribunals. The ancients had a trite and just phrase regarding it: “Est magnum crimen, perrumpere virginis hymen.” But it is now almost universally known to medical practitioners, that a thousand causes besides the natural one may destroy this membrane, such as sudden exertion of the lower extremities, leucorrhœa, prolapsus uteri, “vel etiam petulantibus digitis vel aliis instrumentis lacerata fuit,” excoriations, and various morbid growths, both fluid and solid. It is also a fact, that it may be absent in infants, or may exist at parturition (Mauriceau, Ruysch, Pare, Meckel, Walter, Smellie, Baudelocque, Capuron, Nægelé). Haller fell into this error when he said—“Attamen prima Venus debet esse cruenta.”

For further support of this opinion see Philosophy of Marriage.—There is nothing more certain than that precipitation and impetuosity in the consummation of marriage, or in female defloration, often causes, in the very young or aged individuals, exquisite pain, from contusion,

laceration, &c.; and these evils result more from sensual passion than the legitimate object, the propagation of the species. It is likewise proper to observe on this point, that the Jews and many ancient nations maintained, that the consummation of marriage ought to be characterised by the effusion of blood; and this is generally the case, but there are many exceptions, as when leucorrhœa or other mucous discharges are present, which relax the external genitals and destroy the hymen. In these last cases, there may be no effusion of blood, on the consummation of marriage, though the individual is a virgin—a fact well known to every scientific and practical obstetrician and medical practitioner.

It is also well known that pregnancy has occurred and the hymen perfect. Again, a woman may be delivered and such cohesion occur soon after as to totally impede sexual commerce; and in certain cases there will be copious effusion of blood. I have known such cases, and have recorded them elsewhere. In fine, the most respectable medical authors have been unable to determine whether women who had been depraved twenty or more years, were not virgins, as the presence or absence of the hymen is no real proof of virginity. This is the universal opinion of scientific and learned physicians in all countries. This conclusion has enabled me on many occasions to prevent conjugal separations and divorces, and restore domestic happiness. I hold it as an axiom, that it is the duty of every author to inform his species as much as possible, and thereby to give information, diffuse knowledge, dispel ignorance, and familiarise truth and science.

There is sometimes a second hymen under the first, examples of which are mentioned by Willis, Ruysch, and Legros. It may form a band across the vagina, under the urethra (Smellie, Millot); it has rendered sexual commerce impossible (Hilden, Backer, Merriman, &c.); and in some cases required to be incised, to permit the menstrual evacuation.—Its persistence prevents coition, and the discharge of the menstrual secretion, impedes parturition, favours laceration of the perinæum (Sherwin, Med. Rec.), increases labour pains (Kœymer, Burns, &c.), causes ischuria (Warner, Burns), and pain during defecation (Bardy, Med. Chir. Rev., 1807), and predisposes to convulsions (Finney, Med. Com., vol. iii.) In such cases it ought to be divided by a crucial incision. The hymen was said to be ruptured in the first coitus by the older anatomists, and its remains were called the *carunculæ myrtiformes*, but this last opinion is an error.

The *carunculæ myrtiformes* are four small projections, which are denied by some few modern physiologists to be the remains of the hymen (Hamilton, Velpeau); they are not exactly in the same situation, and have been seen in infants and virgins (see *plate 4, fig. 1, h h h h*).

M. Velpeau states that of the four *carunculæ*, which are observed at the entrance of the vulvo-uterine aperture or external genital fissure, and which correspond with the vertical and transverse diameters of this aperture, the two near the meatus urinarius, and in front of the frœnum belong to the median columns of the vagina, whilst the other two are the remains of the hymen. The first exist in virgins, the second after coition. It is evident that the latter, which are lateral, must vary in number, size, and situation, according as the hymen is broken into two,

three, or more shreds. These disappear during parturition, but the former are persistent until an advanced age (*Op. Cit.* 1835). Behind these is the *orifice* of the *vagina* (*plate 3, fig. 1*), which is nearly but not wholly closed in the virgin by the hymen (*plate 3, fig. 1, i i*).

The *perinæum anterius* is that portion of soft parts which extends from the inferior commissure of the labia externa to the anus (*plate 4, fig. 1, l m*).

It separates the vulva from the anus, and is about an inch and a half in length (*plate 3, fig. 1, m m*). It is lined internally by the mucous membrane of the inferior surface of the vagina, and is covered externally by skin and common integuments. There are cellular substance and muscular fibres between both these surfaces. It is important to state that the perinæum, during the first stage of labour, is an inch and sometimes two inches in thickness; but as the infantine head presses upon it during each labour pain, it gradually expands and becomes thinner, and finally, as the head is about to escape through the external genital fissure, the perinæum becomes almost as thin as parchment or brown paper, and slips over the crown of the head, the forehead, face, and chin of the infant, all of which parts are pressed from below upwards on the curved line, formed by the axes of the brim, cavity, and outlet of the pelvis (see *plate 2, fig. 1*; *plate 15, figs. 1, 2*; *plate 16, fig. 1*).

This is a most wise provision of nature, and, perfect in all her designs, the perinæum, though so much expanded during the passage of the head and body of the infant, will, in general, in a second, or a few minutes after delivery regain its ordinary condition. There are, of course, many exceptions on a large scale.

Beneath the skin and between the point at which the vagina and rectum are in immediate contact, there is a triangular space, filled with fleshy fibres, cellular tissue, fat, nerves, and vessels, and which allows of the distension and elongation of the perinæum during parturition, to the extent of four or five inches (*plate 15, fig. 1*). The pressure on the perinæum is from below upwards, in the axis of the outlet of the pelvis (*plate 2, fig. 1*); and hence the necessity, admitted by all scientific obstetricians, of supporting this part when expanded, by the passage of the infant's head (see *plate 15, fig. 2*), with the naked hand applied transversely, from one ischium to the other, and of pressing with the index finger the head towards the pubis, while the forehead is being elevated in the same direction along the posterior perinæum (*plate 2, fig. 1, h h*; *plate 15, figs. 2, 3*), with the points of the fingers of the other hand. The escape of the head will be greatly facilitated by these manœuvres, and I believe I was the first to advise this practice.

The *perinæum posterius* is the space behind the anus, which extends to the os coccygis (*plate 3, fig. 1, n n*).

It must be obvious from what has been already stated, that in natural labour (see p. 25), as soon as the infant's face has been turned into the concavity or hollow of the sacrum, the occiput, vertex (crown), forehead, and face will be propelled along the posterior perinæum, from the os coccygis or lowest bone of the back towards the anus, and then along the anterior perinæum, forming a protuberance, which obstetricians designate the perineal tumour (see *plate 15, figs. 1, 2*). It therefore

follows, that as the different parts of the head ascend from the os coccygis towards the pubis, or abdomen of the mother (see *plate 2, fig. 1*), from below upwards, the transit may be greatly facilitated, by the obstetrician placing the index and middle fingers of the left hand on each side of the os coccygis, and pressing the forehead upwards, supporting the anterior perinæum at the same time with the palm of the right hand (whether the woman be on the left side or back), placed transversely (see *plate 15, figs. 2, 3*), an aid or operation in strict accordance with the mechanism of natural labour, and productive of great relief to the woman, and safety to the infant.

The *fossa navicularis* is the space situated between the inferior commissure of the labia and hymen (*plate 3, fig. 1, jj*). The *fourchette* or *frœnum* forms the anterior border of the perinæum, and unites the labia pudendi (*plate 3, fig. 1, k k*) inferiorly and posteriorly.

The frœnum is occasionally lacerated very slightly in first parturitions, notwithstanding the judicious aid of the most experienced obstetrician, and the internal surface of the inferior commissure often suffers a similar injury to the extent of half an inch or more. The perinæum has also been lacerated, even through its whole extent, under the management of the most experienced and scientific medical practitioners. This may happen from excessive action of the uterus, or from voluntary efforts of expulsion on the part of impatient, nervous, or irritable women, or from the ignorance of the ordinary medical attendant.

The following particulars relative to the external genitals ought to be known by every medical practitioner, and witness or jurist:—

1. From the superior part of the pubis to the clitoris generally measures about two inches and a half, sometimes more or less (*plate 3, fig. 1 a a*).
2. From the superior commissure of the vulva to the anus, three inches and a half, more or less (*b m*).
3. From the clitoris to the posterior commissure of the vulvar aperture of the vagina, two inches and a half, more or less (*d n*).
4. From the posterior commissure of the vulva to the apex of the coccyx, from three to four inches (*l n*).
5. From the coccyx to the anus about eighteen lines (*n m*).
6. From the anus to the vulva about fifteen lines; and some lines for the opening of the rectum (*m n*).

It is also important to observe, that the constrictor muscle of the vagina, which is imbedded in the external labia, very strongly contracts in some subjects the vaginal orifice during coition, and considerably diminishes it, and that the external pubic artery is so hidden in the inferior strait, that it is rarely lacerated, or the cause of hæmorrhage. This artery is generally felt on the right side of the raphe of the vagina, when labour is advanced, and the head is descending into the cavity of the pelvis; at which time it often pulsates very strongly.

The veins of the vagina are numerous behind the constrictor, and form a retiform or spongy plexus, which becomes erectile during the act of reproduction.

The external vulvar aperture is not longitudinal in all mammiferæ, it is transverse in some, and circular in others. In oviparous animals it

opens near the rectum inside the anus, and is termed cloaca. The mucous membrane of this canal is extremely sensitive, and secretes abundantly under certain circumstances, as during copulation or parturition; but there are many exceptions. The secretion is supposed to be spermatic by the vulgar, which is an error, as the ovaries are the prolific organs in woman, and only supply a drop of fluid during a prolific connexion. There is no emission of semen *foemininum* during the act of reproduction. Certain casuists are in error on this point.—See my works on *Marriage*, *Medical Jurisprudence*, and *A Comparative View of Prostitution in London, Paris, New York, &c.*; and on *Venereal Abuses and Excesses*, 1839.—See also *Ovology* in this work. The perceptible female ejaculation is not seminal or prolific; and the ancient physicians, theologians, and jurisconsults, as well as some of the moderns, were and are in error regarding this subject.—See chapter on Generation.

OF THE INTERNAL ORGANS OF GENERATION.

The *internal organs of generation* in the human female are the *vagina*, *uterus*, *uterine tubes*, *ovaries*, and *ligaments*; which are most concerned in the function of reproduction, and are entitled to minute description (see *plate 3, fig. 2*; *plate 4, fig. 1*).

The *uterus*, matrix, or womb, is a hollow organ, destined to contain, nourish, and expel the foetus, and serving habitually for the secretion of menstruation, and the development of the offspring. It is situated in the cavity of the pelvis, behind the bladder, in front of the rectum, under the small intestines, and above the vagina (see *plate 3, fig. 2, a*). It is of a flattened pyriform or conoid shape, thickened before and behind, its base turned upwards, and its orifice downwards (see *plate 4, fig. 1, a d*). It is divided into three parts—the *fundus* or bottom (*a*), the *corpus* or body (*b*), and the *cervix* or neck (*c*). Its anterior surface adheres inferiorly to the bladder (*plate 3, fig. 2, a b*); its posterior surface is convex, covered by peritoneum, and rests upon the rectum (*c*); its lateral surfaces are concave towards their middle, covered by the *broad ligaments* (*plate 4, fig. 1, m m*), giving origin superiorly to the *ligament of the ovary* (*l l*), the *uterine tubes* (*i i*), and *round ligament* (*n n*); and receiving inferiorly the vessels and nerves called *uterine*, and superiorly the *spermatic arteries* (see *plate 4, fig. 1*). It opens into the vagina by a transverse orifice or slit, called *os uteri*, *os tincæ*, or *utero-vaginal orifice*, formed by two lips; an anterior, which is thicker and shorter than the posterior, which appears thinner and longer, on account of the obliquity of the vagina and uterus (see *plate 4, fig. 1, d*). Its orifice may be thickened, enlarged, irregular, or tuberculated, in those who have had offspring. It is very small in virgins—from three to eight lines; it is capable of admitting a probe, or a small goose-quill in general, and sometimes only a bristle. The smallness of this aperture renders it difficult to understand the possibility of the passage of the seminal fluid into the uterus, and has given rise to many theories of generation, some of which will be noticed hereafter. Nevertheless, it is capable of dilatation, sufficient to allow the body of an infant to pass through it—a fact, says Galen, which we know, but do not understand. The interior of this organ possesses a

cavity of a triangular form (*plate 3, fig. 2, a*), having two surfaces, which are almost in contact in the virgin, but separate and concave in those who have had children. It has three angles—two superior or lateral, terminating in the orifices of the uterine or Fallopian tubes (*plate 4, fig. 1, ii*); the other inferior, forming the internal or cervico-utero-vaginal orifice or cavity of the neck of the uterus, opening into the vagina (see *plate 4, fig. 1, d*). The whole uterine cavity is lined by mucous membrane, continuous with that of the labia, vagina, and Fallopian tubes (*plate 3, fig. 2*). This lining is arranged in folds in the young subject, and forms *lacunæ* (*plate 4, fig. 1, f*). There are numerous follicles near the orifice, which are designated *glandulæ Nabothi*, which often secrete abundantly under venereal excitement, and are supposed by some to be the seat of cancer. Its posterior surface offers projecting wrinkles, disposed in the form of a palm, and hence called *arbor vitæ*. The cavity of the neck is oval, about twelve or fifteen lines in length, and five or six in width. It possesses a median and transverse line, and a number of muciparous glands, and sometimes small vesicles, which were formerly deemed germs, and called *ova Nabothi*.

Dimensions.—The length of the virgin uterus is twenty-seven lines, or two inches and a quarter (*plate 4, fig. 1, a d*); the width of the body twenty lines, and of the neck thirteen lines; the thickness of the body, nine lines; of the neck, six lines; of the parietes, four lines; of the body, four lines; and of the neck, three lines; the lips in the vagina, two or three lines; the weight seven or eight drachms. After the female is a mother, the uterus measures two and a half or three inches in length; the body, two inches; the neck, one inch and a half; the base, twenty to twenty-four lines; the neck, fifteen or sixteen lines; the body, twelve or fourteen; each wall, six lines; the os uteri, or utero-vaginal orifice, six lines (*plate 11, figs. 1, 5*); the weight, about two ounces. These dimensions were ascertained by Roederer in a great number of uteri.

The uterus varies in size, but is generally from two to three inches in length, one inch in thickness from before backward, and one inch and a half in width at its upper or broad extremity. This small organ becomes so enlarged in the last month of pregnancy, as with its contents to nearly fill the abdomen, and after delivery it again resumes its small dimensions. Such is the wise provision of nature as regards the structure and chief function of the uterus (see *plate 3, fig. 2*; *plate 4, fig. 1, a c d*; *plate 12,.*)

Directions.—The uterus is said to be in the direction of the axis of the superior strait of the pelvis (*plate 2, fig. 1, e e*), and with the axis of the vagina forms nearly a right angle (*plate 3, fig. 2*); its orifice looks downwards and backwards, and its posterior lip is lower than the anterior. The direction will vary according to the situation of the woman, the fulness of the bladder or rectum, or when it is in a state of spasm or contraction. It is generally inclined a little to the right side (*plate 3, fig. 2*; *plate 4, fig. 1, a c d*).

Organization, Structure.—The whole uterus is covered posteriorly with peritoneum; the body only is covered anteriorly; the neck is supported by the bladder (*plate 3, fig. 2, a b*). The uterus consists of an external

and internal membrane, a peculiar dense greyish fibrous tissue, numerous vessels, nerves, lymphatics, and some cellular tissue. The external or peritoneal tunic forms two folds at the sides, called the *broad ligaments* (*plate 4, fig. 1, m m*). Their anterior and posterior layers are closely united, but allow a passage for the uterine and ovarian vessels and nerves, and some muscular fibres. Their upper borders form three folds, which contain the round ligament (*plate 4, figs. 1, n n*), the tube (*i i*), and the ovaries (*l l*).

Muscular Tissue of the Uterus.—Vesalius (*De Fabrica, Corp. Human. lib. v.*), Malpighi, Ruysch (*De Muscul. in fundo uteri, 1726*), Noorthwyck (*Uter. Gravid. Human, 1726*), Wrisberg (*Comment. Phys. Med.*), Meckel (*Manual Anat.*), Lobstein, Hunter, Charles Bell, Velpeau, Rosenberger, Duges, and a host of modern anatomists, maintain the muscularity of the uterus; while Boehmer, Blumenbach, and a few others, deny it. The course and direction of the fibres were disputed by anatomists. Vesalius, Malpighi, and others, said it was impossible to separate them, as they were so interlaced; Ruysch, Sir Ch. Bell, and others, that they formed an orbicular muscle at the fundus, to expel the placenta, which is denied by Heister, Smellie, and Haller; Hunter, Sue, &c., that they were intermixed; Leroy, Meckel, and many German anatomists, that they formed an internal and external layer of muscle. Baudelocque and his countrymen declined to determine the course of the uterine fibres; though they supposed them to form fasciculi parallel to the axis of the uterus, or longitudinally, or in circles placed horizontally; that the body and fundus were principally formed by the first, and the neck by the second. This view is corroborated by recent writers. The fibres are longitudinal, and oblique externally (Rosenberger); transverse at the interior of the neck (Verheyen); and circular at the tubal orifice (Weitbrecht); the exterior fibres form the round ligaments (Rosenberger).

Velpeau has dissected a great number of uteri, and arrives at the following conclusions:—1. There exists under the peritoneal tunic a thin, dense, elastic, cellulo-fibrous layer, sometimes, but not always, muscular, in which the fibres have not a fixed direction; 2. A thick layer of transverse fibres, united similar to the constrictors of the pharynx, and being most deeply transverse; but the fibres were longitudinal and oblique on the neck and internal surface of the organ. All these layers have for a base a cellulo-fibrous tissue, surcharged with fibrine; the fleshy tissue is developed in this substance as in the intestines, and the uterus appears to result from the reunion of two cylindroid canals. Mad. Boivin and M. Guerin give a similar account of the structure of the uterus.

The internal membrane of the uterus is said to be mucous by many; but this is denied by Gordon (*System of Anatomy, 1815*), Chaussier (*Transl. of Rigby, by Mad. Boivin*), Ribes (*Soc. Med. d'Emul., tom. viii.*), Beclard, and Azzoguidi. The most careful dissections, putrefaction, ebullition, and chemical agents, have never demonstrated the existence of mucous membrane to these observers, unless towards the end of pregnancy, when there was, according to them, a pellicle of a new formation, and not the normal membrane. Beclard declares that the

lining membrane of the uterus is not a complete mucous layer, but wants the epithelium.

It is certain that the mucous membrane of the uterus cannot be separated except during pregnancy, or after parturition; but still it possesses all the characters and performs the function of mucous tissue. It supplies mucus in a healthful state, purulent mucosity in a pathological state, and sanguineous exhalation, and is the seat of polypus, &c. That which lines the uterus is generally considered to be mucous membrane. Mucous and vesicular follicles occupy the neck and external orifice, and these were named *ova Nabothi*.

The *arteries* which supply the uterus are the spermatics and hypogastrics, which penetrate the substance at the sides of the neck. The ovarian arteries are given off by the aorta or emulgents, are distributed to the broad ligaments, ovaries, and finally arrive on the sides of the body of the uterus. Those of the right and left sides, and the superior and inferior, anastomose with each other. The *veins* are distributed in the same manner as the arteries, enter the internal iliac and ovarian veins. These vessels form a cavernous tissue, are greatly enlarged during pregnancy, and are distributed between the fleshy layers of the uterus. They acquire the diameter of four or five lines during pregnancy, are deprived of valves, and adhere by their external surfaces to the fleshy tissue of the uterus. From this disposition we may expect absorption of matters in the uterus, and phlebitis, as proved by MM. Velpeau, Dance, and others. (Velpeau, Thesis, 1824. Arch. tom. vi. Rev. Med. tom. ii., 1826. Salles, Thesis, 1827. Dance, Arch. 1829, tom. xix. xx. Lee, Observations on Diseases of Women, 1832).

The *lymphatics* are large and numerous during pregnancy, and follow the course of the blood-vessels. They open into the pelvic and iliac glands. They may be inflamed like the veins, on account of absorbing heterogeneous and morbid matters in the uterus, and some say, cause phlegmasia dolens.

The *nerves* are supplied by the renal and hypogastric portion of the great sympathetic, are six plexuses (Tiedemann), and are divided into branches, which supply the fundus and follow the course of the uterine arteries; while the neck is supplied by the first pair of sacral nerves, which explains the excessive sensibility of this part. We can therefore easily account for the numerous sympathies which exist between the uterus and every part of the body, through the medium of the great sympathetic nerve.

Vital Properties, Sympathies, Uterine Action.—The sensibility of the uterus is dull in the ordinary state, but vivid in inflammation, or in spasm, during pregnancy, or after delivery. Contractility exists but slightly in the ordinary condition of the uterus, but is greatly increased by enlargement of the organ. Still we observe menstrual pains, false pains in extra-uterine foetation, pains from coagula after delivery or in abortion. The uterus strongly sympathises with the internal and external genitals, with the mammæ during menstruation, pregnancy, and delivery, with the stomach, brain, heart, &c.; in fine, with the viscera of the head, chest, abdomen, with the organs of the senses, and with all parts which are abundantly supplied by the cerebro-spinal system of

nerves, which accounts for the innumerable new sensations and functional derangements incident to pregnancy and uterine disorder or disease. When the uterine secretion or menstrual fluid is suppressed, we observe the whole organs of the body more or less disordered; and we also know how often this secretion will be influenced by diseases of other and remote organs. These facts gave rise to the axiom, that the womb was the cause of almost all diseases of women.

*Uterine Tubes (Tubæ Fallopianæ).—*The *uterine*, or *Fallopian tubes*, are two small canals, four or five inches in length, of the size of a goose-quill, extending from the lateral angles of the fundus or superior part of the womb, with which they are connected, towards the ovary, passing through the middle fold of the broad ligament, floating loosely in the pelvic cavity, opening into the abdomen, and terminating in a fringed extremity, called *fimbriæ* or *morsus diaboli* (*plate 4, fig. 1, i i k k*). The cavity of these seminiferous tubes is large near the uterus, but only capable of containing a bristle, narrow in the middle, and again enlarged towards the fimbriated extremities (*k k*). It is composed of a peritoneal tunic, of a musculo-vascular substance, similar to that of the uterus, and of a mucous membrane, folded in the longitudinal direction. The fleshy substance consists of circular and longitudinal fibres, arranged similar to those of the intestinal canal. The mucous membrane has been as easily separated as that of the œsophagus, consists of valvular folds, which admit the passage of the ovum towards the uterus (*plate 4, fig. 2*), but prevent its retrograde motion towards the ovary, and consequently the passage of the seminal fluid of the male (Velpeau, Baudelocque, neveu). The cavity of the tube is often filled with whitish mucus, like all other mucous surfaces, which accounts for the mistake of those who stated, that they found the spermatic fluid in this canal. The tube receives its vessels from branches of the ovarian, and its nerves from the great sympathetic; it is erectile and contractile, and is put in motion by the excitement of the uterus and ovaries during coition. It becomes erect during the latter state, seizes the ovary, and permits the passage of the seminal fluid, or a vapour from it, to that organ. Haller caused its erection by injections of the uterus in the dead body. If a ligature is applied round each Fallopian tube in a rabbit, impregnation will be prevented (Haighton, Blundell, &c.), and the fecundated ovum has been arrested in the tube (*plate 4, fig. 2*). If the tubes are rendered impervious by inflammation, incurable sterility will result. The tube has been observed grasping the ovary when death occurred by poisoning a few hours after coition; and also when the woman was killed in the act.

*Ovaries (Ovaria).—*The *ovaries* have long been denominated testes muliebres, and are properly the seminal glands of woman; the secreting organs of the germs, situated near the sides of the uterus, enclosed in the posterior folds of the broad ligaments attached to the uterus by proper ligaments, are oblong, oval, about the size of an almond or bean, and of a yellow grey or whitish colour (*plate 4, fig. 1, l l*). These ovoid whitish bodies are from an inch to an inch and a half in length, and resemble in appearance and feel the male's testes, and hence termed testes muliebres. They are composed, 1, of a peritoneal tunic; 2, of a

fibrous membrane, thick and hard, perhaps fleshy, like the uterus and ovarian ligament, of which it may be an expansion (Velpeau); 3, of a reddish tissue, dense and firm, called dartos by the ancients; 4, of mi-liary vesicles, ova, from the number of fifteen to twenty, called Graafian vesicles, filled with an albuminous fluid; 5, sometimes of a body of a yellowish grey colour, covered by a cicatrix, and called *corpus luteum*. The best description of this last body hitherto published, will be found in the Cyclopædia of Practical Medicine, by Dr. Montgomery, of Dublin, and subsequently in an original work. Each ovum or ovarian sac contains a germ, which bursts the peritoneal tunic of the ovary after conception (*plate 5, fig. 7*).

At puberty, the ovaries become active and developed, producing by sympathy a series of changes in the uterus, its appendages, the mammæ, larynx, &c. The ovary is an organ essential to generation; it forms the germs, or perhaps secretes a fluid in different sacs, eggs, ova, which is as essential to generation as the spermatic fluid of man. One of these vesicles or eggs, which contains an ovum or germ, is supposed to burst at the moment of conception, leaving behind a small cicatrix. A small roundish body is now formed in the ovary, about one-third of an inch in diameter, which bears a close resemblance to the secretory portion of the kidney. This is called the *corpus luteum*, and remains for three or four months after delivery. It has been long held that the corpus luteum is a positive proof of pregnancy; and Professor Montgomery, of Dublin, seems to have fully proved the accuracy of this conclusion. He denies the statements of Sir E. Home, Dr. Haighton, and others, that true corpora lutea can exist in the unimpregnated state. The detection of a corpus luteum, according to the former author, is a positive proof of a recent pregnancy; and a knowledge of this fact may have great influence in criminal trials, in which acquittal or conviction may be determined by the evidence as to the existence or non-existence of recent pregnancy. The true corpus luteum is never found but as a consequence of impregnation. It surrounds the Graafian vesicle, is formed around both its layers, and not between its coats, or by thickening of the inner membrane. Dr. Montgomery believes it to be formed between the coats. The colour of the true corpus luteum is a peculiar orange, totally unlike the yellowish-red, brick-dust colour of the false body. The false corpora lutea, or yellow oval-shaped bodies, found in women who have never been pregnant, are smaller in size, more irregular in shape, and deeper seated in the ovary, and are enclosed within the cavity, and not around the interior surface of the Graafian vesicle.

In some cases there is thickening of the coats of the Graafian vesicle, and in all, the cause is an effusion of blood into the cavity of a Graafian vesicle. (Report of the Proceedings of the Royal Medico-Chir. Society, June 11, 1839.—Structure of the Corpus Luteum, by Dr. Robert Lee, *Lancet*, June 29, 1839.)

The ovaries bear so close a resemblance to the testes of the male during intra-uterine existence, that it is scarcely possible to distinguish one from the other, when both are in the pelvis. The germ was said to pass through different canals to the uterus, and not through the tube, until the time of Fallopius; the ligament of the ovary was supposed to

be the chief passage. Wharton and Mauriceau admitted one or two canals, which opened into the vagina; an idea lately revived by Gartner, of Copenhagen, as he found them in the large quadrupeds; but as yet they have not been discovered in the human female. There is some reason in this opinion, as it will appear in the account of Generation, that there are the strongest grounds for supposing the absorption of the seminal fluid, and its transmission to the ovaries from the vagina can only account for impregnation in many cases. Notwithstanding the small size of the ovaries, they are capable of considerable enlargement when diseased. They may vary from the size of a pigeon's egg to a magnitude sufficient to fill the whole abdomen, specimens of which may be examined in the Hunterian Museum, at the Royal College of Surgeons, in London. See also Dropsy of the Ovary.

Ligaments of the Uterus.—The *ligaments of the uterus* are the broad and round.

The *broad ligament* (ligamentum latum) is an extended fold of peritoneum reflected from the body of the uterus, and connecting it to the pelvis (*plate 4, fig. 1, m m*). The uterus and its two broad ligaments, one on each side, divide the pelvis into two cavities: an anterior, which contains the bladder; a posterior, in which the rectum is placed. Each ligament is subdivided into two or three folds, which enclose the uterine tube, ovary, and round ligament, and have been called utero-vesical.

The *round ligament* (ligamentum rotundum) (*plate 4, fig. 1, n n*), arises from the uterus before and under each of its tubes, passes through the inguinal canal, and terminates in the groin, mons veneris, and labia. It is a round, long, muscular cord, composed of blood-vessels, lymphatics, nerves, and cellular substance, which assists the vagina in supporting the uterus in its situation, and prevents its retroversion, when pressed on by a distended bladder. It is supposed by Sir C. Bell to perform the function of tendon, and to be connected with two muscles, which he has described as situated near the fundus uteri. Professor Joerg, of Leipsic, is of opinion, that the round ligaments transmit sensation from the clitoris to the Fallopian tubes and ovaries during coition, so as to establish a sympathy or consentaneous feeling between all parts concerned in generation. The uterus, without the round ligaments, would be constantly retroverted or pushed back into the cavity of the sacrum by the bladder. Extended by the ascent of the gravid uterus, and when the woman is on her knees, the round ligaments may produce severe pains in the groins and thighs.

The *vagina*, or vulvo-uterine canal (*plate 3, fig. 2, g*; *plate 4, d h*), is a cylindroid tube which extends from the external genital aperture to the uterus. It is continuous with the great lips and hymen, ascends to the neck of the womb, whose circumference it embraces (*plate 4, fig. 1*). It is situated near the concavity of the pelvis, in front of the rectum, and behind the bladder (*plate 3, fig. 2*; *plate 4, fig. 1*). This canal, in the virgin state, is about three or four inches in length anteriorly, and about one in diameter, and six or seven inches in length posteriorly. It is curved, its concavity looking upwards, and its convexity downwards (*plate 3, fig. 2*); and it forms an angle of about sixty degrees with the great diameter of the uterus (*plate 3, fig. 2*; *plate 12*). Its direction is

inferiorly in the axis of the outlet (*plate 2, fig. 1, ff*), and superiorly in the axis of the cavity of the pelvis (*gg*). Its inferior or external aperture is not always in the axis of the perineal strait or outlet of the pelvis, according to Smellie, Velpeau, &c.—a conclusion which I consider correct.

Its external surface is connected with surrounding organs, except at the superior half of its posterior aspect, where it is covered with peritoneum, which descends between it and the rectum, and forms a cul de sac; so that vaginal ruptures may penetrate into the cavity of the peritoneum (*plate 3, fig. 2*).

The posterior region of its *external surface* is supported in three-fifths of its extent on the anterior part of the rectum (*c*), with which it forms the recto-vaginal septum (*h*). On approaching the vulva, its inferior fifth is separated from the rectum for the whole length of the perinæum. Its superior fifth is free in the pelvis, and is covered with peritoneum. Its anterior region is united at first by means of dense and thick cellular tissue to the inferior surface of the bladder, to form the vesico-vaginal septum, and afterwards to the urethra, from which results the uretro-vaginal septum (*plate 3, fig. 2*).

Its *internal surface* presents transverse elevations or folds, similar to those of the neck of the uterus (*plate 3, fig. 2*), traversed superiorly and inferiorly by a septum or longitudinal column (*plate 4, fig. 1, g*), situated in the middle of the anterior surface, and sometimes by three or four similar columns, arranged at equal distances from each other; and becoming much thicker as they approach the vulva (*plate 4, fig. 1, g*). The extremities of the median columns form the anterior and posterior carunculæ myrtiformes (*plate 4, fig. 1, h h h h*). These folds or rugæ are prominent in virgins, or those who have rarely indulged in sexual intercourse; they are obliterated in married women after delivery, but return, sooner or later, in some time afterwards to a greater or less extent.

The *vaginal cavity* terminates superiorly in a circular cul de sac, which is much deeper posteriorly than anteriorly (*plate 3, fig. 2; plate 4, fig. 1*). It is an inch above the orifice of the womb posteriorly; before, the mucous membrane is reflected on the cervix, and the posterior and inferior lip of the uterine orifice projects more into the vagina than the anterior (*plate 3, fig. 2; plate 4, fig. 1, d*), and *vice versâ*.

The parietes or sides of the vagina are nearly in contact in the ordinary condition, but as they possess great extensibility, the capacity of the vulvo-vaginal canal varies considerably. It is about an inch in diameter, but may be greatly amplified by forced extension. In some subjects it is wider in the middle part than at its external or internal aperture. At other times it is dilated in the middle and superior part, in women who have had offspring. Its dilatibility is such as to adapt it to the functions of generation and parturition; and its contractility very speedily reduces it to its usual state after the performance of these functions. The orifice is the narrowest part of the canal.

The vagina is composed of two structures, an *external* and an *internal*.

The *external* layer is a prolongation of the tissue of the uterus, is a yellow cellulo-fibrous structure, contains pale fleshy fibres, which are

not to be confounded with the elliptic muscular sphincter of the vulvar orifice, which is called the *constrictor* or *sphincter* muscle of the vagina. These act under the impulse of volition, those under the action of venereal enjoyment.

The arteries and veins of the vagina are very numerous, and form inferiorly a true spongy or erectile tissue (*plexus reteformis*), which becomes tumefied during coition, and may considerably contract the diameter of the vagina for a time, but finally subsides.

The *internal surface* of the vagina is lined by mucous membrane, which is continuous with that of the uterus and Fallopian tubes. It contains an epithelium, follicles, villosities, &c. It cannot be separated near the neck of the womb, and in that situation follicles or villosities cannot be demonstrated. (L'Helut. Thesis, Paris, 1826). The mucous follicles are situated at the bottom of the rugæ or folds, are often the site of chancres, and secrete abundantly when excited.

The *vessels* and *nerves* of the vagina are supplied from the hypogastrics.

There are two glands situated under the lateral carunculæ myrtiformes, and between the mucous membrane and fleshy layer. These were called *vaginal* or *prostate* glands of Bartholin. Their use is unknown. Smellie held that their orifices were placed under the meatus urinarius, and expelled a fluid during coition; and Gartner considers them the orifices of the canals which he thinks he has discovered in some inferior animals.

The vagina possesses the power of contraction, erection, and dilatation. It adapts itself to the penis; it permits the birth of an infant, contracts immediately after, and in a few days is reduced to its ordinary condition, or very nearly so. This construction shows great wisdom, and favours the function of reproduction.

The erectile tissue and constrictor muscle close the vaginal orifice when the slightest excitation is applied. This fact is also observed on making vaginal examinations. But the resistance of the sphincter muscle is diminished, when there is leucorrhœa or copious discharge of mucus from the vagina, which causes relaxation, and is a frequent disease in children and virgins, and much more so in married women. This may depend upon constitutional debility and diseases, as well as local causes. In this case there will be a slight degree of resistance only; while in the former it may be so great as to prevent sexual congress, or this can only be effected with more or less laceration and loss of blood. Thus, there is some justice in considering a woman a virgin who colours the nuptial couch; but it is evident that she may be equally so when relaxed, or when the vagina dilates and adapts itself to the penis, for the reasons already mentioned. The use of mild astringent injections arrests the mucous secretion, and strengthens and contracts the vagina, to such an extent as to lead able medical practitioners to suppose that virginity existed in cases of prostitutes, who had pursued their calling for twenty years. Abstinence from venery, for weeks or months, produces the same beneficial results. Amplitude of the vagina is capable of inspiring disgust; but may be removed by the remedies just described. Buffon has remarked that women, who had been married young, presented all the signs of virginity at an advanced age, after having scrupulously ob-

served a rigid continence for several years; and there can be no doubt of the fact.

Four other ligaments are said to connect the vagina: two anterior, utero-vesical; two posterior, utero-sacral; but these are rarely observable.

As the organs now described and delineated by accurate original engravings, may be seriously injured by sexual congress, by forcible defloration or violation, as well as by parturition, and the injudicious use of obstetric instruments, it is clear that their structure and relative positions to each other should be well known to medical practitioners and witnesses. It is scarcely necessary to observe, that both external and internal organs may be contused, lacerated, inflamed, and affected with abscess, ulceration, or gangrene by the causes just enumerated, which induce a variety of complaints, that will be described under the head of diseases in future chapters. There is a great loss of human life caused by the maladies under notice, and they ought, therefore, to be closely studied by every one engaged in the practice of the healing art, or who may be called upon to give medical evidence in any court of justice.

Independently of the reasons now assigned for studying the structure of the sexual organs, it is also to be remembered, that they may materially derange the organs contained in the pelvis, as well as all parts of the body.

The uterus or womb is situated between the bladder and rectum, or lower bowel, and when it becomes enlarged by pregnancy, may press unduly upon one or both of these organs, and occasion irritation in one or both. Hence arise the frequent desires to evacuate the bladder or lower bowel, or if the pressure be great on the neck of the bladder or urethra, retention of urine may be induced. When the pressure of the womb is on the rectum, it may induce tenesmus or constant desire to evacuate the bowels, costiveness, and by impeding the free return of the venous blood, cause piles (see *plate 12*). In fine, the sexual organs are liable to a vast number of diseases, and we must study these parts in their natural and morbid states; though superficial observers, as well as licentious and hypocritical persons, object to the anatomical description of the organs under consideration; but they forget that the preservation or destruction of the life of a prisoner, accused of female violation, entirely depends upon medical evidence; that the lives of a pregnant woman, and the innocent offspring in her womb, can only be saved by medical evidence when pregnancy is pleaded in stay of execution; and also that female honour, when foully aspersed and calumniated, can only be vindicated by such evidence.

The melancholy case of a late and most unjustly calumniated lady of title, which will be recorded by the future general, as well as medical historian, is now, October, 1839, fresh in the recollection of the public; and although her unsullied virgin fame was fully established, before and after her death, by the highest medical authorities, it was not until the false insinuations of persons of her own high rank and sex, who duped an incompetent physician to sanction them against her reputation and honour, had hurried her prematurely to the tomb of her noble, renowned, and patriotic ancestors.

CHAPTER III.

GYNÆCO-PHYSIOLOGY—PHYSIOLOGY OF WOMAN.

THE physiology of woman may be divided into four parts: 1, establishment of menstruation, puberty, or nubility; 2, utero-gestation, or pregnancy; 3, parturition, or delivery; 4, lactation, or suckling.

The term nubility is applied to that period of female life which is adapted to the performance of the generative function. The history of nubility comprehends four distinct periods: 1, puerile sterility, or infancy; 2, the establishment of fecundity, or puberty; 3, established fecundity, or periodical menstruation; 4, the cessation of fecundity, or menstruation, the critical age, or senescence.

Puerile Sterility—Infancy.—From the period of birth to the twelfth or fourteenth year, in temperate climates, the genital organs are not proportionably developed with the rest of the body; their functions and sympathetic influence are rarely perceptible, and very seldom exerted; so that there is scarcely any difference in the feelings of the sexes until the age of puberty. Differences, however, do exist in their tastes, habits, manners, and especially in the voice, which is much sharper in females.

The diameters of the pelvis in the first years of life differ little in both sexes, and are nearly reversed, as the longest is the antero-posterior, or the transverse, and the pelvis has many of the characters of that of the male (*plate 1, figs. 1, 2, 3, pp. 16—19*).

The uterus is about thirteen or fourteen lines in length in the new-born infant, and eighteen in a girl of ten years (Rœderer). Its function consists in the secretion of a tenacious mucus; and its neck is larger, harder, and more cylindroid than the body.

The tubes and ovaries are proportionably more developed than the uterus. The ovary is elongated, vermiform, red, and compact, without vesicles. It is eight or ten lines in length in the new-born infant; it is sixteen at the tenth year, and twenty at puberty (Rœderer). The vesicles of this organ sometimes appear during the first year; but generally not before the eighth or tenth. The tubes do not develope in proportion to the uterus and ovaries.

The vagina is capable of admitting a finger at birth, remains strait and wrinkled in infancy and childhood; it is two inches in length in the new-born infant, and four in the adult, but capable of greater extent. It is straiter below than above, in infancy, and has a relaxed fold in the form of the palate at the inferior part of its external orifice, which is the hymen; and this in later years becomes semicircular, and considerably obstructs or contracts the external orifice of the vagina (*plate 3, fig. 1*).

The vulva is small, uncovered by hairs before puberty; the great labia are thick, and projecting a little. The mons veneris is large and prominent; the nymphæ and clitoris are sometimes protruded beyond the external labia; and the mucous membrane is red or rosaceous, smooth, firm, and humid.

The gland of the infantine breast is about the size of the end of the finger, its tissue is red and firm, and resembles that of the thyroid gland;

it often furnishes a lacteous or serous fluid in new-born infants of both sexes, and remains inert for some years afterwards. It is to be borne in mind, that the female breasts are generally subjected to great injury by the pressure of stays, which are seldom made so as to allow sufficient space for the growth of these organs; they compress and waste both the breast and the nipple, obliterate the external extremities of the lactiferous tubes, render suckling extremely difficult, and cause a predisposition to abscess and excoriated nipples, thereby depriving the infant of the food intended for it by nature.

The genital organs in the human female do not undergo any remarkable change from the period of birth to puberty, except that their development is not proportionate, or very seldom so, to that of the rest of the body. It is from the twelfth to the eighteenth year that they acquire their normal condition and their functions. They now rapidly enlarge and become fitted for the function of reproduction. They remain in this state in unmarried women for years; but after one or two parturitions, they become very slightly augmented in size, and continue in this condition until senescence, when they again decrease or assume their primitive state.

The ovaries form the germs, the tubes convey the vivifying fluid of the male, and then the impregnated ovum into the womb, in which it is nourished and protected for nine months, when it passes into the world through the vagina and vulva. The numerous anomalies of the sexual apparatus depend on defect, arrest or aberration of development, and on diseases anterior or posterior to birth, and will be described hereafter.

Establishment of Fecundity—Puberty.—The period of puberty will vary according to climate, education, and constitution; an elevated temperature, as in tropical climates, an excited imagination, and a sanguineous temperament, accelerate it, and induce it at the ninth or tenth year; while cold, as in the polar regions, an inactive life, and a lymphatic temperament, do not permit it to arrive until the eighteenth or twentieth year. Moyer mentions a Swiss girl who became a mother at nine years of age. Even in the same country, differences occur in this respect. Foderé and other writers on medical jurisprudence mention many instances of this, and ascribe them to the altitude, temperature, and other localities of the districts. On the borders of the Mediterranean, girls menstruate very early; but at a distance from it, for example, in the department of the Ain, there are evident effects produced by the nature of the soil. “Thus,” says Foderé, “on the borders of the marshy districts, puberty is late;” two individuals from these districts, in one of the Parisian hospitals, at the time at which he was writing, one eighteen, and the other twenty years of age, displayed no signs of puberty; whereas, on the banks of the Soane, and in the south of France, it is not uncommon for boys of thirteen and fourteen to be the fathers of children begotten on girls of twelve and thirteen. In this country and in France puberty generally occurs from the twelfth to the fourteenth year. Girls have become puberous in France so early as the age of eight years and a half. (Velpéau).

In high situations, exposed to cold north-east winds, boys do not show

signs of puberty till after eighteen years of age; this is even the case in places on the coast of the Mediterranean, if thus exposed, as mentioned by Foderé; and the period is still later in the north of Europe. But the influence of climate is more strikingly perceived in the puberty of girls than of boys: thus, menstruation, which is the sign of puberty in girls, begins very early between the tropics, sometimes so early as eight, nine, and ten years of age; whilst boys in the same climates are incapable of becoming fathers until they have attained to thirteen years; though Ballard, a French writer, mentions a case in which a female attributed her pregnancy to a boy ten years of age. In the peninsular region of India, in Java, and the tropical islands, girls begin to menstruate so early as eight and nine years of age; in the temperate zone, the period is from twelve to fourteen; while in Lapland and Norway, menstruation rarely occurs before the twenty-first year of age; and when it takes place, the returns are at long intervals, and frequently only during summer. Heat has therefore a considerable influence in bringing animals, as well as plants, to a premature maturity. In the cotton mills of Manchester and Glasgow, and in many manufactories, which are kept at a high temperature, girls arrive early at a state of puberty: and, therefore, the occupation and condition of the female should always be kept in view, in giving evidence, when a question as to puberty, defloration, or pregnancy is raised.

Habitation and pursuits in the country, simplicity of manners, frugal regimen, and the temperature of northern regions, retard the appearance of menstruation. An idle or luxurious life, high living, frequenting balls, theatres, and places of public amusement, the arts of imitation, as those of design, statuary, &c., music, the study of romantic and licentious works, the use of exciting liquors, habitation in populous towns and cities, and warm climates, tend, on the contrary, to accelerate it. Every thing that warms the body and excites the imagination, accelerates puberty; and this explains the reason why girls in crowded towns and cities perform this function sooner and more freely than those residing in the country.

It is well known that female children from the age of seven to fourteen years, who reside in large cities, are more forward and curious than young women in the country at the adult age, and this arises from the corruption of morals and manners.—See my works on *Marriage*, and also on *Prostitution in London, Paris, &c.*

The most remarkable changes take place in the economy at puberty. The body becomes more developed, the temperament more sanguineous or nervous, and the constitution stronger and more vigorous. Many diseases cease spontaneously, as scrofula, rickets, tinea or ringworm, epilepsy, &c.; while others become developed, as chlorosis, hysteria, bronchocele, various inflammations, and hæmorrhages. There are numerous sympathetic irritations in the different organs at the approach of puberty. The face and other parts of the body are often covered with various eruptions. There is also an ephemeral fever, sometimes headach, hysteria, derangements of the respiratory organs, cough, laborious breathing, palpitation and inordinate action of the heart, epistaxis, hæmoptysis, hæmatemesis, hæmaturia, intestinal hæmorrhage, hæmorrhoids, chlo-

rosis, dysmenia, amenia, amenorrhœa, dysmenorrhœa, menostasis, menoxenia, and many other temporary disorders. The moral and physical characters are modified: those which distinguish childhood are lost; the tastes of the girl are similar to those of a fully developed female; the passions are more powerful and durable, the moral and physical sensibility are greater, and the secret desire for marriage arises. The character of woman's mind is chiefly determined by the part she bears in relation to generation. Her destiny to be united to a husband, and to become a mother, is perceived in the plays of her infancy, and afterwards becomes manifest in the commencing struggle in her bosom, between her modesty and her inclination for the other sex, as is seen in her lovely blushes, often united with a noble feminine pride and reserve, until she meets the man of her heart, when all these feelings are succeeded by a full and unlimited abandonment of herself to the object of her affection. Conjugal love has speedily, however, to submit itself to the stronger feeling of maternal affection, of the power of which we have many and the most extraordinary examples.

At the approach of puberty the feminine voice changes; but not so much as in the male. The pelvis rapidly enlarges; but it is not completely ossified or developed before the twenty-first year, although in the sixteenth it often acquires its ordinary dimensions.

At the period of puberty the uterus becomes double its former size in one year; it is thicker, rounder, and more firm, redder, congested, and erectile, and there are pains, heaviness in the loins, groins, hips, and thighs, with bearing down sensations. This state is accompanied by a local or general plethora, a general *molimen*, a determination of blood to the womb, and sometimes by a febrile state, or paroxysms of heat. At length a thin, watery, yellowish, or sanguineous exhalation, a critical hæmorrhage takes place, which is the first *menstruation*. The quantity of fluid discharged is small, is of a pale or reddish colour, sometimes a vivid red; its evacuation recurs at the end of four, six, or more weeks, for the first eruptions are rarely periodical. There is great variety as to recurrence, according to individual and hygienic circumstances. We see women who menstruate regularly twice a month, and some even at a shorter period, others every two, three, six, or more months. But we generally observe that the periods are shortened, according as women indulge in sexual commerce, spirituous or vinous potations, high living, indolence, or the gaieties or frivolities of life in crowded towns or cities; but these are generally punished by the occurrence of sterility or incurable diseases. After menstruation is fully established, the uterus is fit for reproduction; but examples of pregnancy occurring before the age of puberty are well attested, though extremely rare. (Sir E. Home, *Phil. Trans.*, vol. lii.: Velpeau). It is a general rule that women who menstruate regularly have an aptitude for conception; but there are some who feel no amorous impulse, before or after the evacuation; and others who experience it long before the establishment of this function. More are sterile, though they menstruate, in consequence of diseases in the womb, its tubes, or the ovaries. Fecundation rarely, if ever, occurs before menstruation, but Hamilton, Velpeau, (*Traité Complet. de l'art. des Accouch.*, 1835), Wiel, (Obs.

rar., vol. ii.), De la Motte, (*Traité Compl. des Accouchem.*), Mondat, (*De la Sterilité*, 1833), Kahleis, (*Journ. Complement.*, tom. xviii.), and Kleeman, (*Magaz. die Rust.*, tom. xviii.), relate cases of women who had children, though deprived for months or years of their periodical function.

Dr. Hamilton knew a lady who had two infants before she menstruated. (Lectures). M. Velpeau describes the case of a healthful woman, who was married ten years, though she never menstruated, and was most anxious to be a mother. Her husband was young, and was a father during a former marriage. This able author saw another woman at the hospital at Tours, who never had the catamenia, although the mother of a healthful son, then aged about fifteen years. Mondat's patient was the mother of three infants. The woman mentioned by Kahleis had three successive pregnancies; and this physician names two other women who were impregnated before the establishment of the menses. Klee-man describes the case of a woman, who was married twenty-seven years, and only had the menses two months after her eighth parturition; and she continued extremely regular until her fifty-fourth year. The absence of the menses is, however, in a vast majority of cases, a proof of sterility, and generally depends upon some vice of conformation of the womb or its appendages.

The menstrual fluid is said not to be invariably coloured at its first eruption; and this fact explains, in the opinion of Dr. Dewees, those cases of conception which are reported to have happened before the appearance of the menses. It may, also, perhaps account for impregnation in those women who have borne children, though they never menstruated; but, in my opinion, further evidence is necessary to prove that this colourless fluid is menstruuous. Were it so, we should expect to find it of much more frequent occurrence than the universal observation of physicians will permit us to suppose.

The tubes and ovaries also enlarge, become redder, and more sensitive at puberty; the former present the structure of muscle, are affected with a peristaltic motion and erection, and seize the ovary in fecundation (Vallisnieri, Cruickshank, and others); they secrete an abundance of a white opaque mucus, which has often been mistaken for male or female semen. They present yellow spots, corpora lutea, produced by excitation, spontaneous or provoked, of the genital organs, even without the approach of the male (Home, Brugnone, Cruickshank, Haighton, Blundell); but *not* corpora lutea, according to Montgomery (*Cyclopædia of Pract. Med.*, art. Pregnancy), (*vide ante* p. 58). The ovaries appear to be the centre of general sympathetic excitation, and are excited by that of the uterus. Women have had uteri without ovaries; but were deprived of all the signs of puberty and nubility (Pears); others, in whom the ovaries were extracted (Pott, Simon, Lizars), had lost all the characters of nubility and power of fecundation, though the uterus remained. The ovaries were called testes muliebres by the ancients, and it is now universally admitted by physiologists, that they secrete a prolific fluid (sperm), designated germ, which is as essential to generation as the male fluid; but this is not effused during the act of reproduction, as is generally and erroneously imagined (*vide* p. 48).

The uterus may be absent, and the ovaries healthful, and then sexual desire may remain, and a determination of blood exist which requires the application of leeches to the vulva or anus.—(Dupuytren).

The vagina gradually enlarges at puberty, becomes more sensitive, spongy, and erectile.

The vulva is now more firmly closed by the enlargement of the labia, and is surrounded with hairs, and these appear on the pubes. Its mucous membrane becomes redder, more vascular, sensitive, and humid. †

The breasts become prominent and conoid; the nipple projects, is conical and obtuse, of a red or brown colour; it possesses an erectile power on being touched, and is sometimes painful on the slightest pressure, and occasionally discharges a serous fluid. The areola, or brownish circle round the nipple, is of the same colour as in infants, but is much larger and darker.

Established Fecundity.—Menstruation.—From the age of puberty to the forty-fifth or fiftieth year the menses or uterine secretion recurs monthly, in temperate climates, and with most women at the end of each lunar month; but in some cases every fortnight or three weeks, in others every five or six weeks, and in some every fortnight regularly. Menstruation commences at puberty, is generally suppressed during pregnancy and lactation, or during suckling; but there are occasional exceptions, as some women perform this function during both the last-mentioned states.—(Deventer, Baudelocque, &c.) The aptitude for generation in woman commences with it, and this is lost at its termination. The secretion continues from puberty to old age, periods that may be called extremes, the spring and winter of female life, as they indicate the commencement and cessation of fecundity. Menstruation is a function similar to circulation, digestion, &c., and not a disease, as some have erroneously imagined.

The duration and quantity of the discharge vary very considerably; the extremes are from two to eight days; and half an ounce to five or six ounces, in temperate climates. The menstrual fluid differs in its physical and chemical properties from blood; it never coagulates in a healthful state, is devoid of fibrine, and has a peculiar odour. There is always a determination of blood to the womb before and during menstruation, and if the woman receive any external injury, walk, dance, ride on a rough road, or suffer from bad cough, diarrhoea, &c., clotted blood may appear mixed with the periodical evacuation. But this is during disease and not in perfect health. The colour of the menses resembles that of venous blood, the fluid kept in a phial for years, is more florid, yet darker than arterial blood. Its eruption is often preceded or followed by a sero-mucous discharge, which ceases on its appearance, or disappearance. Each eruption is generally preceded by symptoms of plethora, of melancholy and mental depression, hysteria, or lassitude. The eyes are generally surrounded by black circles, especially in women of fair complexion; there are pains about the loins, hips, pelvis, back, and breasts, disorder of the stomach and bowels, sense of heat, pruritus, or itching in the uterus or vagina; the uterus is congested and enlarged, and sometimes ecchymosed, its orifice is soft and open, hence conception readily occurs after the cessation of

the periodical evacuation. The vagina is relaxed, and more extensible; the vulva is turgid and humid; the breasts are generally more or less swollen, and sometimes the areola or space round the nipple assumes a more marked colour; the ovary is very much excited, and presents corpora lutea, which are not so well marked as in women who have borne children, and are totally different, according to Dr. Montgomery, Dr. Lee, and others (*vide* p. 58).

The girl who is about to become puberous, and to menstruate, may be free from all disorder, or suffer from many unpleasant sensations, as cold shiverings, sense of weight and tension in the hypogastrium, pelvis, and with a feeling of bearing down, both in the vagina and rectum; pains in the loins, hips, inferior extremities, as well as in the back, chest, and head, which cause lassitude and dislike to motion; there is sometimes headache, a sense of choking in the throat, noise in the ears, derangement of vision, of taste, or of smell: in fact, there is disorder of all parts of the body, or cutaneous eruptions, convulsions, hysteria, and sometimes epilepsy may appear. I know three sisters who are always attacked with epilepsy at the commencement of menstruation; and many who suffer most severely from the most intense hysteria, which in some approaches to catalepsy, and in others to idiocy. I have frequently seen cases of this kind both at the hospital and dispensaries which I attend. The appetite, in some cases, becomes bad or depraved, and the girl wishes for improper foods, as raw vegetables, chalk, oranges, &c. In some there is fever or hæmorrhage from the nose, lungs, stomach or bowels. There may be vomiting, diarrhœa, colic, flatulency, and constipation. Boudelocque knew a woman who had vomiting and purging every month for three or four days, but she never menstruated. The secretions and excretions may be also deranged, as it is proved by ptyalism, incontinence of urine, diarrhœa or constipation, or more or less abundant perspiration. The countenance is somewhat altered, the eyes may become dull, and surrounded by a leaden colour or black circle. The respiration may be more or less impeded, there may be oppression of the chest, palpitation of the heart, spasmodic cough, and the voice may become hoarse or sometimes suppressed. I have known aphonia or loss of voice in such cases as those now under consideration. The sleep is more or less disturbed and unrefreshing. The imagination is rarely excited by lascivious ideas, at other times it is depressed: the individual becomes stupid, sad, nervous, and extremely hysterical. Women are more subject to nervous, hysterical, and spasmodic complaints during menstruation than at any other time. They are occasionally dejected and melancholy, and extremely fond of solitude and separation from society. Such are the most common symptoms which precede the first or any subsequent menstruation; but to attempt an enumeration of all those that may occur, would require volumes for their history. All these symptoms may disappear on the eruption of the menstrual fluid, and all are easily explained by the origin and connection of the uterine nerves with the great sympathetic, in fact, with all others in the human body, for all are connected; and hence disorder or disease in any organ or part of the body, may derange the functions of the whole economy.

The first eruption of menstruation is usually succeeded by an interval more or less long, according to temperament or constitution, and mode of life of the individual. One, two, three, six, or even twelve months may elapse before the function is again performed; though in general, and when the health is good, it recurs every twenty-eighth day; but there are numerous exceptions. In a perfect state of health (but this is very rarely observed in large towns and cities), the menstruation recurs every month, or a few days afterwards. The natural history of this important function will be given as I proceed. It will appear, when I describe the cessation of this secretion, that a similar revolution in the economy to that now mentioned may occur, and that hygienic precautions, with medical and moral precepts must be observed at this important epoch of female life. It is a general rule not to administer active medicines during menstruation, unless when painful; and then narcotics are indispensable, as the free use of opium, morphia, &c.

The menstrual fluid is a secretion from the uterus, according to John Hunter; an opinion also attested by numerous eminent physicians who observed it exude from the organ when inverted (Vesalius, Peyer, Morgagni, Mauriceau, Littre, W. Hunter, John Clark, J. Hamilton, Money, &c. &c.) It was considered a secretion by Haller, Bourdeu, Hunter, and others. It was said to depend on local or general plethora (Aristotle, Galen, Moschion, Simson, Astruc, Lobstein); on a superabundance of carbon and nitrogen (Osiander); on the feebleness of the coats of the veins (Clifton); on fermentation (Paracelsus, Sylvius, De Graaf, &c.); on a particular molimen (Sthal and Duges); on erection (Emmet); on amorous phlogosis (Le Cat, Abernethy, &c.)

This secretion was said to proceed from the uterus by the Greeks and Arabians, from the vagina (Columbo, Sue, Pineau, Bohn, Desormeaux), from the veins (Vesalius), from the arteries (Ruysch), arterial capillaries (Winslow and Meibomius), from the glands (Lister,) from particular small receptacles (Simson), and from the venous sinuses (Astruc).

The menstrual secretion incontestably proceeds from the uterine cavity in the great majority of cases, and this is the received opinion of modern physiologists. It may be felt escaping from the orifice of the uterus with the finger. In a case of procidentia uteri, the justly celebrated Professor Hamilton, of Edinburgh, saw the secretion exuding from the internal surface of the uterus. He stated this fact in his lectures when I had the good fortune to be his pupil. It has distended the womb when the orifice of this organ, or that of the vagina or vulva, is impervious by accidental or congenital vices of conformation. The cavity of the uterus has been ecchymosed in women who died during the menstrual evacuation, and also contained the catamenial fluid. (Columbo, Mauriceau, Morgagni, Heister, Pison, Van Swieten, &c.)

It is likewise certain that the menstrual secretion may be vicarious, and issue from the surface of the vagina or vulva, or from ulcers on any part of the body. This is the case, perhaps, when a pregnant woman continues to menstruate regularly. This deviation is occasionally observed, and also when there is a vicarious discharge from the urethra,

rectum, stomach, intestinal canal, air passages, or any part of the tegumentary surface of the body.

Jacobson relates a case of vicarious menstruation from the roots of the nails, and afterwards from the gums (*Bibl. Med.*, 1828, tom. iii., p. 28). During six years the evacuations escaped from the breasts, and afterwards from the lungs. In cases of suppressed or vicarious menstruation, there is often bleeding from the nose, spitting of blood, vomiting of blood, discharges of this fluid from the bowels, bladder, or rectum. Sir Astley Cooper (*Lectures on Surgery*, 1824) and Baron Dupuytren (*Journ. Hebdom. Fev.*, 1829, p. 257) have described menstrual ulcers, that is, ulcers which become covered with blood every month, when the menstruation is suppressed or has never appeared. Raynal observed a tumour in the hypogastric region, which arose after suppression of the menses, finally opened, and afforded a sanguineous discharge periodically, for many years (*Journ. Univers.*, tom. xiv., p. 361). Chantourelle saw a patient who had a similar discharge from the finger, then from the angle of the eye, and lastly from the navel (*Trans. Med.*, tom. vi., p. 7). Bonfils mentions cases in which the discharge was from the thigh, groin, axilla, and one from the index finger (*Op. cit.*, pp. 28—31). A wound of a burn afforded it in the cases related by Dupuytren (*Journ. Hebdom. jam. cit.*) and Ansiaux (*Clinique Chirurg.*, 2d edit., p. 303). Duparque attended a case of periodical epistaxis during the absence of the catamenia (*Trans. Med.*, tom. vi., p. 7). Clesio states that blood issued from leech-bites on the knee and epigastrium (*Op. Cit.*, p. 10). Lastly, Gardien gives the history of an unfortunate girl, in whom a vicarious discharge issued successively from almost every part of the body (*Accouchemens*, 1807, tom. i., p. 348). Vicarious menstruation is, however, very rare, and sometimes is caused by actual idiopathic disease, totally independent of the catamenia.

Menstruation was said to be accelerated by civilization (Emmet, Roussel, Aubert); but every well informed physician is aware that it is regular in uncivilized women; and that there is a sanguineous discharge even in some of the inferior animals. There is a periodical sanguineous evacuation from the genitals in the ourang outang and some of the monkey tribe; and a glary discharge, more or less coloured, at the season of copulation, in quadrupeds, birds, &c.; but this cannot be compared to the phenomena of the menstrual function. The function of menstruation is performed in all climates and by all women, with few exceptions, during the period of life already mentioned.

The presence of menstruation is vernacularly designated “the courses, a change, the flowers, nature, indisposition, periodical or female health;” and among the middle and lower classes, the woman is said to be “ill, unwell, out of order, to have a change, to be regular, or to be well in certain respects, or to be poorly.” The term poorly is also employed in all diseases by women in the humble rank of life.

The eruption, or first appearance of the menstrual discharge or catamenia, generally occurs, in temperate climates, from the twelfth to the sixteenth year; in the meridional nations, from the eighth to the twelfth year; and in the polar regions, from the fifteenth to the twentieth year.

It has occurred in this country so early as two years and a half (Lond. Med. and Physical Journ., vol. xxviii.); at eight years and a half (Op. Cit., 1810, vol. xxiv.); and between the third or fourth year (Sir A. Cooper, Medico-Chirurgical Transactions, vol. iv.) In Abyssinia, girls are said to be fecund at the ninth year; in Turkey in Asia, and Arabia, at ten; in India, at nine; in Turkey in Europe, at eleven; in Italy and Portugal, at twelve; in France, at thirteen; and, in this country, from thirteen to fifteen. There is a case of a girl recorded in the Mem. de l'Academie des Sciences, who was a mother at the age of ten years. I have known three mothers in this country at the age of thirteen. I have fully noticed cases of this kind in the late editions of my works on Marriage, and on Prostitution, &c. in all countries. Mardelshof relates a case, in India, in which the breasts began to develope at the third year, menstruation occurred before the fourth, and the individual was a mother at the fifth. This report I consider unworthy of credit. M. Velpeau has known it occur in Paris from the ninth year and a half to the twelfth; he does not agree with those who have maintained that menstruation may commence at birth, which he very properly thinks, with Nægelé, was the result of disease; neither can he credit the case lately published at Havannah, in which an infant was said to have had the discharge at the eighteenth month, and regularly every month afterwards. She had all the characters of puberty. A case is recorded by Dr. Wall, in the second volume of the Medico-Chirurg. Trans., of a girl who had begun to menstruate at nine months, and had continued regular from that time; his words are, "*Quod fluxus menstruus*" (?), "*primum cum jam erat vix novem menses nata, et singulis mensibus usque ad presens tempus, erupisset.*" A case nearly similar is described in the Archives of Meckel, in 1827, and copied into the Lancet. A few drops appeared at the ninth month, and at the eighteenth there were hairs on the pubes, and the breasts were considerably developed.

Some travellers assert that girls have been mothers in Turkey at the sixth or seventh year. Dr. Prideaux states that Cadisja menstruated at the fifth year, when Mahomet espoused her, but he did not consummate the marriage until she was eight years old. This is a popular account, for it is recorded in the Koran, that she was over forty years of age when she became the wife of the prophet. Van Swieten relates that he had seen a child who menstruated at the age of a month, though of a delicate habit; she was nubile at seven, married at nineteen, and had several children (?). This case is extraordinary, as menstruation is generally more precocious in plethoric than in delicate girls. Oslander, of Gottingen, has recorded one hundred and thirty-seven cases, in which nine women menstruated at the twelfth year, eight at the thirteenth, twenty-one at the fourteenth, thirty-two at the fifteenth, twenty-four at the sixteenth, eleven at the seventeenth, eighteen at the eighteenth, from ten to twenty at the twentieth, one at twenty-one, and one at the twenty-fourth year.

The quantity of fluid secreted during menstruation varies in different climates. According to Hippocrates, twenty ounces, or a pint and a quarter of our measure, were discharged in the Archipelago; eighteen ounces, according to Galen; from six to twelve, according to Haller;

from four to six ounces in this country; but the quantity will very much depend upon the physical and social habits of the individuals. Women often die from excessive menstruation in Java; while in Lapland and all polar regions the discharge is exceedingly trifling, and recurs but twice or thrice a-year. The quantity will vary according to an infinite number of circumstances relative to temperament, climate, aliment, diseases, &c. Thus, the opulent and luxurious citizen will lose more than the peasant, and the Caffres and Hottentots than the Laplanders. The Dutch menstruate abundantly, in consequence of placing warming-pans between the lower extremities during winter; and cooks and others often suffer from excessive overflow when exposed to a high temperature, as in kitchens and manufactories.

Pliny and his contemporaries maintained that the catamenial fluid was poisonous—a most ridiculous opinion, though in some degree supported by M. Velpeau, who agrees with Pliny, Columelle, Bonaciolo, and the Arabians, that the miasm arising from a woman during menstruation is capable of decomposing milk and other fluids; and, finally, that blood retained in the genitals for any length of time, acquires more or less deleterious properties. This truly able writer forgets that the catamenial fluid is not blood, and has been retained for years, in cases of imperforate hymen, without producing any considerable local irritation or disease. In a woman aged sixty-six years, in whom the vagina was obliterated, the womb was largely distended, and contained a litre, about thirty-two ounces of viscid menstuous fluid (Berard, *Clinique des Hôpitaux*). The same fact is attested by Amand, in two cases. Many other authorities might be cited on this point. Albertus Magnus was of the opinion, “that menstruating women were poisonous, so that they intoxicated animals by looking at them, they killed children in the cradle, they spotted a clean glass, and whoever had congress with them became leprous, and sometimes cancerous, and therefore intercourse should be carefully avoided during menstruation.”—(Alberti Magni de *Secretis Mulierum*, &c., 1687). These notions were said to be borrowed from the Jews, who order menstruating women to be separated from society. It is true that certain women exhale a peculiar odour during this function, especially in warm weather, and when cleanliness is neglected. The fluid may be irritating, and excoriate the labia and vagina, similar to the mucous secretion in certain kinds of leucorrhœa, and even produce slight urethritis in the male, but it is not noxious or poisonous. I once attended a man, who confessed to me, that he had mixed this fluid with porter, and drank it, to excite amorous impulse, which I need scarcely say was not produced. I have been assured of a similar case by a surgeon of my acquaintance. This is a popular error in all countries.

It has also been remarked that the menstrual secretion is pale in scrofulous women, darkish and foetid in scorbutic, and acrimonious in cancerous and other malignant ulcerations of the uterus. We observe many cases of this kind, both in public and private practice. But we must not confound the morbid with the healthful condition of menstruation; and every one knows that in the latter state, the secreted fluid is innoxious.

The uterine fluid differs in its chemical and physical properties from blood (Brand, *Phil. Trans.*, v. ii.); it possesses no serum, but albumen combined with colouring matter (M. Toulmanche, *Arch. de Med.*, Dec., 1829; *Lond. Med. and Surg. Journal*, 1830, vol. iv., p. 78); (M. Thenard, in 1817); it possesses no fibrine (Lavagna).

The menstrual fluid is of a reddish brown colour, much darker than arterial, and redder than venous blood; is sparing on the first day, is increased on the second, it diminishes on the third, and ceases on the fourth or fifth. The discharge is most abundant, in some women, on the third, fourth, or fifth day; in others, on the first or second day. In some instances it ceases for a day and returns on the third, fourth, &c. This interruption is often observed in hysterical women. It usually escapes in drops, but is sometimes so profuse as to flow on the ground. Each menstruation may be accompanied with severe pains in the back, loins, uterus, and rectum, and a sense of weight or bearing down in the lower bowel, more especially in aged hysterical unmarried women. In such cases there is painful menstruation, which may depend on narrowing or complete closure of the orifice of the womb by spasm, which may be ascertained with the finger. In a few cases there will be induration or excessive smallness of the uterine orifice, which may be dilated with metallic bougies. I attended an unmarried lady in the highest rank in life in 1835, who laboured under ovarian disease on both sides, and also disease of the rectum. She suffered most acutely for the fourteen preceding years, from painful menstruation, which was accompanied by the most intense hysteria and spasm in the uterus, ovaries, and rectum. This was so severe that the orifice of the womb was completely closed by it—a state which I repeatedly ascertained with the finger. She remarked that for some hours after these hysterical and spasmodic attacks, there was no menstrual evacuation, and it returned profusely in the course of the day or night, after the spasms ceased. She suffered most severely on the second day; and she continued to menstruate in this manner for five, six, and eight days. She was successively attended by some of the most eminent physicians and surgeons of this metropolis, and all declared that there was no cure for her complaint; and that free doses of opium were the only remedies to palliate her agonies. Dr. Baillie, Dr. Warren, Sir H. Hallford, Sir A. Cooper, Sir B. Brodie, Dr. Merriman, Dr. Locock, and Mr. Salmon, attended this lady in succession. I commenced the use of metallic bougies with a view of dilating the orifice of the uterus; and I finally succeeded in passing an instrument termed number eight. It was highly gratifying to learn, that on the next periodical evacuation she was perfectly free from pain during the continuance of menstruation. This plan was continued for three months; but the hysterical spasms, and uterine pains returned, though with less severity, as might be anticipated from the advance of her other diseases.

In some women there is neuralgia of the uterus or its cavity, or irritable uterus; and in such cases false membranes are often expelled with painful menstruation, as noticed by most obstetric authors, and lately by Chaussieur and Burns. Denman, Hamilton, and Dewees have remarked that women thus affected are sterile. This is not always the

case; I have a lady now under my care who passed false membranes before her marriage during each menstruation, and she has had twelve miscarriages during the last three years, or since the period of her marriage. She was attended by two of the most eminent physicians in Dublin before she came under my care. She bore her first infant at the seventh month. I have also met with many other exceptions. Mojon supposes the cause of infecundity to be imperviousness of the uterine orifices of the tubes, by the false membranes. Many other causes of sterility exist besides those stated by this author. It has also been long observed, that prostitutes and women who abuse coition, are generally sterile from this cause. The menstrual evacuation recurs every month, as its name indicates, sometimes sooner and sometimes later; it has returned every tenth day, from the twelfth year to the fortieth, and the patient in good health (Dewees); it has appeared every twelfth day, and in one case the woman was almost always menstruating, though in good health, but thin and of an extreme sensibility (Velpeau). It occurred regularly every fortnight in a young unmarried lady, who placed herself under my care. It is important to state that some women menstruate on the thirtieth, thirty-fifth, or fortieth day; others every second, third, fourth, or sixth month (Linnæus), without any inconvenience; and the latter instances are common in Greenland, Lapland, and other cold countries. The quantity evacuated is very trifling, in some under the adult age; but may become considerably increased after marriage. It may also be profuse and excessive; cause great debility in some, and often temporary sterility.

It was stated by Gall, that the recurrence of menstruation was from the first to the eighth day, or from the eighth to the fifteenth; but this assertion requires further proof. The same woman may menstruate on any day in the week or month; and, when pregnant or a nurse, ceases to enjoy this function. Again, the periodicity of the catamenia was ascribed by Aristotle, Van Helmont, Mead, and Roussel, to the influence of the moon; and hence the adage, "*Luna vetus vetulas, juvenes nova luna repurgat*"—"The moon purges old women in its decline, and young at its commencement." This opinion is controverted by the fact, that the same woman may menstruate in the different phases of the moon, in the course of one or many years. If menstruation depended upon lunar influence, all women should have the discharge at the same time, which every medical practitioner knows is not the case.

In conclusion I have to observe, that I fully assent to the following position of Dr. Ashwell:—"I believe it to be one of the instances in which the researches of able and intelligent men will terminate in their tracing it to the will of the Creator; or, in other words, they will regard it as a law of nature, that the fleshy uterus of the human female shall once every month, by a secretory action, produce a certain sanguineous fluid, just as the liver secretes bile, and the kidney urine." It is exhaled by the capillary extremities of the uterine arteries through the mucous membrane.

The use of this secretion is to fit the womb for fecundation; its suppression during pregnancy allows the breasts to take on a new action for the nourishment of the foetus, and they are enlarged for that purpose

in a day or two after delivery; and it is suppressed during lactation or suckling, for this same reason. There are, however, exceptions to all these statements, as conception has happened before menstruation; and the latter has occurred during utero-gestation (Mauriceau, Deventer, Haller, Heberden, Hossack, Fodéré, Capuron, Francis, Dewees, Mayo); and every one knows, during lactation. It is on record that many of the women in Greenland do not menstruate, though they bear infants; but this assertion is, I think, very doubtful. It is not the absence of menstruation or amenia that causes sterility in all cases, though women thus affected are generally fruitless on account of some defect in the genital organs.

Cessation of Menstruation—Senile Sterility.—The menstrual secretion ceases, in temperate countries, about the forty-fifth or fiftieth year, sometimes so early as the twenty-fifth (Haller, Dewees, Velpeau); and again, not until the fifty-fifth, sixtieth, sixty-fifth. I have heard of a woman delivered in her sixty-third year; at the seventieth (Richerand, Magendie); eightieth, ninety-fifth (Haller, Velpeau); (Lond. Med. and Surg. Journ., 1830, vol. v., p. 338); and one hundredth (Blancardi). Desormeaux has known menstruation continue from the sixtieth to the seventy-fifth year. M. Velpeau knew a woman, aged twenty years, who had ceased to menstruate at eighteen, and who enjoyed excellent health. Another, aged thirty-two, who had lost the function at the age of twenty-one years, without any inconvenience (Traite Compl. de l'art, des Accouch.) The function ceases in some, and returns at a later period of life, as at the eightieth (Dupeyron, Acad. des Sciences, 1768), or ninety-th years (Lond. Med. and Surg. Journ., vol. 6). Desormeaux considers such returns as evidence of disease, and not of menstruation. Harles relates the case of a mother of five children, who continued to menstruate to the age of sixty-two years.

I have often been consulted by women of sixty, sixty-five years of age and upwards, who supposed themselves injured by excessive menstruation; but the fluid coagulated, was blood, and issued from an ulceration of the uterus, or some other of the pelvic organs. Such cases are extremely common.

It is a physiological axiom, that fecundity continues until menstruation ceases. A question occasionally arises in Courts of Equity—Can a woman be a mother in this climate after the age of sixty years? Such a case was discussed in the Court of Chancery in England, in 1834. A woman was delivered in Edinburgh in 1816, at the age of fifty-four years (Edin. An. Reg.) Marra, an Italian physician, attended a woman, aged sixty, for dropsy, but found her pregnant. Haller describes two women: one was delivered at sixty-three, and the other at seventy. Such cases most probably occur in Northern nations, where menstruation commences late, and continues to a much later period of life than in warm climates. It is also remarked that women in cold countries have had thirty children (Olaus and Redbuck); and I have known a woman in London, who was the mother of twenty-seven, and another of thirty-three infants, some of which were twins and triplets; and one who had forty children. It is stated that menstruation appears so early as the ninth year in Abyssinia, and ceases at the eighteenth, and hence

polygamy is allowed the people (Bruce), (*Philosophy of Marriage*, 1839). It continues in general about thirty years, in temperate climates, and during the most appropriate ages for the reproduction of the species. It ceases between the age of thirty and forty in many warm climates, and sometimes much earlier, as already mentioned.

When menstruation is about to cease, the period is called critical, "the change, or turn of life, the climacteric period;" and many important changes take place in the constitution at this epoch. All the characters of puberty and the peculiarities of women cease, the breasts collapse in most cases, the fullness of habit disappears, the skin shrivels, and appears too large, and loses its colour and softness, and many diseases develope, occasionally and rarely, in the womb, ovaries, and breasts, which had lain dormant for years. The cheeks and neck wither, the eyes recede in their sockets, and the countenance often becomes yellow, leaden-coloured, or florid, and the women become corpulent, and lose the mild peculiarities of their sex. When this period has, however, passed, women often enjoy better prospects of health and of long life than the other sex, and become remarkably corpulent. This period is also designated "the climacteric, the critical time, the critical age;" and often before its arrival the menstruation is irregular, may be absent for weeks or months, the abdomen becomes tumid, there is loss of appetite in the morning; and the woman considers herself pregnant, which is scarcely ever the case. According to the statistical reports of Finlayson, Moret, Châteauneuf, and Lachaise, no more women than men die between the fortieth and fiftieth years; while Dewees, D. Davis, and Desormeaux contend, and Sagilo with them, that women are not more liable to diseases at this than at any other period of life. This conclusion accords with my own observation and experience.

The cessation of menstruation, however, is often preceded by gradual derangement of health; there is nervousness, with all its Proteian symptoms, or more serious diseases appear; so that moderate purgation is often of the greatest advantage.

The disorders most common at this period are hypochondriasis, nervous irritability, indigestion, derangement of the digestive organs, costiveness, diarrhœa, intestinal and other hæmorrhages, spasms in different parts of the body, giddiness, apoplexy, and severe or transient pains in the back, loins, inferior extremities, and different parts of the body. Chronic complaints are often aggravated, and organs predisposed to disease very often suffer. Disorganizations of the uterus, ovaries, mammæ, rectum, and bladder are very frequently developed. Daily observation in hospital, dispensary, and private practice, confirms the correctness of this statement. The more general opinion, however, is, that most women are generally exempt from such diseases.

The menstrual function rarely ceases without more or less disorder. In some cases the cessation is preceded by a gradual diminution, or an increase of quantity of the menstrual secretion, amounting to hæmorrhage. The evacuation may recur every three or six weeks, and there is often severe mucous leucorrhœa. In many women it ceases without any inconvenience whatever, and better health may be enjoyed than at any former period of womanhood. In others, especially those who lead

a luxurious life, the "critical age" is, rarely, an epoch of licentiousness. Pregnancy is often suspected by such persons, but it rarely exists. I have been consulted in several cases of this description, in some of which the women supposed themselves in labour, and I was even called to perform the Cæsarian operation in some of these cases. But all ended in air or fat—hope was entertained;—*donec tandem spes omnis in flatum et pinguedinem fascesseret*. The head often requires attention at cessation of menstruation, as sudden flushes of the face, vertigo, and drowsiness, are urgent symptoms. Cupping, or leeching the back of the head or nape of the neck, with purgation, pediluvia, &c., are the best remedies. It has been observed, that the health is more or less deranged for years before and after the cessation of the menses, and that enforcement of the regular evacuation of the bowels daily is necessary.

The changes in the uterus and its appendages deserve notice.

The internal and external orifices of the uterus become diminished, or partially or totally obliterated (Duges); or the cervico-uterine orifice is similarly affected (Mayer); the uterus and ovaries are atrophied or hypertrophied; the rugæ of the vagina and mucous membrane of the uterus are relaxed, and often pour out a copious mucous discharge; the vulva is flaccid and dilated: there is often prolapsus uteri, and the breasts decrease considerably, or speedily disappear.

Women often, however, mistake the effect for the cause. In chronic and fatal diseases of any organ, the powers of life are diminished, all the functions are impaired, and menstruation is deranged or suppressed. Pulmonary consumption affords a good illustration. Menstruation ceases towards the last stage of phthisis, and women suppose that the absence of the function is the cause of the disease. They request medicines to restore it; but these have no effect, as loss of vitality from destructive disease is the cause of the effect they are desirous to remove. It is scarcely necessary to observe, that no medicine can re-establish a function when life is at a close. It sometimes happens that eruptions, and other diseases, which disappeared at the age of puberty, return on the cessation of menstruation, and are to be treated on ordinary principles.

Dr. Marshall Hall, in his *Commentaries on Diseases of Females*, strenuously recommends attention to the general health at the cessation of the catamenia, and enjoins the necessity of regulating the bowels, diet, air, exercise; and in cases in which vertigo or drowsiness appears, advises the occasional abstraction of blood, by cupping, from the nape of the neck, or leeching, and purgation. He also considers that the health is affected several years before and after the climacteric period; but there are many exceptions. Some women suffer no inconvenience at this period, nor do I think all more liable to diseases than at any other time of life.

It appears from the preceding sketch, that every process in the female economy is imperfect until the appearance of menstruation; it is the sign and establishment of health; without it beauty cannot exist, or will be speedily effaced; the order of vital actions will be altered; the mind become languid, and the body depressed. During its presence women are weaker, more delicate, and more susceptible of impressions; all their organs partake, more or less, in the condition of the uterus. The

whole train of nervous sympathy is thrown into action; the vascular and nervous systems, the digestive and respiratory organs, are liable to derangement of function at this time. Hence, the universal rule of medical practitioners—a practice consonant with the prejudices of women themselves—is to omit all active medicines during the healthful function of menstruation. During the performance of this function all strong mental and corporeal exertions ought to be carefully avoided, as passions of the mind, travelling, riding in carriages or on horseback, long walks, dancing, and exposure to cold and moisture, every one of which causes may suppress the evacuation. Sexual intercourse is also most improper and dangerous.

We find the most precise directions in the Sacred Writings as to every circumstance connected with this function: a separation was enjoined, and nuptial intercourse wisely interdicted. The excellence and wisdom of the Levitical injunctions will be admitted by every scientific medical practitioner, when he recollects the injurious effects of sexual commerce under such circumstances, especially to the female; nor does he want evidence to convince him, that the male has contracted simple gonorrhœa from this cause. Excessive menstruation is often induced by the violation of this precept, and every well-informed physician is aware of the numerous disorders to which women are subject from excess of their peculiar function.

The hygienic precautions relating to menstruation are scarcely ever duly attended to in this country. The young female, at the age of puberty, is not informed as to the change which is to occur to her; she is left ignorant on the subject; she is much astonished at the first eruption of the uterine secretion. The mental emotion thus excited, often interrupts the proper establishment of the evacuation for one or two years. She is not cautioned to avoid, during each periodical evacuation, exposure to cold, humidity, all strong emotions, violent exertions, walking, riding, dancing, &c., exciting aliments and drinks, &c., unless by the Hebrew persuasion.

It is not enough to use washing after the cessation of the periodical evacuation, it should be employed daily, to preserve the organs in a healthful condition. Were this practice generally adopted we should meet with much fewer cases of debilitating discharges, which are so prejudicial to health and personal comfort.

It is well known that the first appearance of the catamenia will depend upon the state of constitution, mode of life, habits, &c. of the individual, and in the opinion of many, upon the manners of those with whom young women converse. It is also to be remembered that women, in general, are weak during the periodical evacuation, and are averse to sexual congress: the most abandoned of the sex will not allow it, unless impelled by the direst distress or profligacy. It has also been generally observed, that women of full habit, those who live luxuriously, those confined in warm apartments, and those who indulge in sexual commerce, menstruate most copiously. But we often observe individuals of full habits, who have the secretion sparingly, while pale and delicate women have it copiously. It is, in general, much increased by marriage, and may be rendered excessive, or painful, until it finally ceases; and

in such cases sterility is the usual result, or some incurable disease of the womb or its appendages. There is no truth in the opinion, that the menstrual fluid nourishes the foetus, and is suppressed for that purpose; but the correct explanation of the cause of its suppression is afforded by the physical changes which take place in the uterus after conception; and the established physiological axiom, that two functions cannot be properly performed by the same organ, at the same time.

Again, animals that are deprived of this secretion by nature, nourish their offspring in the womb.

When menstruation returns during lactation, or suckling, conception very shortly follows: and the breast-milk is generally considered by women, and medical practitioners, to be deteriorated, and unfit for the nourishment of the infant.

It is very manifest from the preceding account of this function, that every process of female economy to the climacteric age, is affected by the periodical secretion; and women very properly ascribe most of their diseases to the derangement of this important function.

CHAPTER IV.

REPRODUCTION OF ORGANIZED BEINGS—UNIVERSAL CODE OF GENERATION OF PLANTS AND ANIMALS—ONE PRIMITIVE GENERATION—SPRING, THE SEASON OF GENERATION.

HAVING now described a part of the important function peculiar to the human female, which fits her for assisting in the continuance of the species, I shall next proceed to give an outline of the history or reproduction of organized beings, with a view of illustrating that of mankind. Were I to enter upon all the circumstances which more or less influence the use and abuses of the sexual functions, I should publish a large folio volume; but I have already considered the most influential of them in two other works already quoted, to which I must again refer the reader for information. I shall in the following pages confine myself to the physiology of generation, and trace the new being from the moment of formation to the period of its independent existence—thus including human generation, ovology, and embryology, with the physiology of the gravid uterus.

I must here request the reader's indulgence for what, at first sight, may seem a digression, but which, I venture to hope, goes a great way to explain, not only the cause of reproduction of plants and animals, but likewise many influences on health, diseases, and human happiness. I hope and trust, therefore, the reader will pardon the following observations:—It is now assumed by some, that the gaseous is the primary state of matter; that its revolution into the solid state is effected by meteoric action, and that this law applies not only to the earth, its

depth, the ocean, but also the planetary bodies. The Newtonian theory of gravitation is now considered magnetic attraction.

Dr. Sherwood has demonstrated that there is but one cause of all movement wherever it exists, and this is the electric fluid in its positive and negative states.—*New Philosophy of Motion*, copied from an American journal into the Literary Gazette, July 22, 1837.

This doctrine was previously promulgated, in 1830, by Peter Murphy, Esq., in his work entitled, “Rudiments of the Primary Forces of Gravity, Magnetism, and Electricity, in their agency on the heavenly bodies,” London, 1830, in which his opinions are more fully set forth, and in his work on Meteorology, 1836, one of the most extraordinary, and if correct, one of the most important to mankind.

The Weather Almanack of the author has been thus noticed by the public press.—“If the basis of this theory prove sound, and its principles be sanctioned by a more extended experience, it is not too much to say, that the importance of the discovery is equal to that of the longitude.”—*Times*.

“It is certainly one of the most important, if true, publications we have seen in our generation.”—*Morning Post*.

I have carefully observed from day to day the predictions of the author with respect to the weather, and I have found them astonishingly true: but to form a correct opinion, the reader must peruse the account of Meteorology, appended to the Weather Almanack by the author, 1838, as well as his other works, to which I have already referred. The author is no pretender, but one who has devoted some years, of no ordinary application, to his inquiries and calculations, and “as he feels satisfied of their correctness, he will at least have the satisfaction to think that he has not lived in vain; or that the time and application bestowed on the subject (meteorology) has been misemployed; and that, whatever the results may be personally to himself, they promise to be attended with advantages of no ordinary kind to the remainder of the human race.”—*The Weather Almanack*, 1838, p. 48.

The author seems to prove that electricity and magnetism are the primary active forces of nature in the sun and planets—the primary sources of temperature; the electric of heat, the magnetic of cold; also of the conditions of climate, geographical distribution of animals and plants—that the currents of electricity and magnetism *traverse each other at right angles*—the magnetic equator is situated between the tropics—explanation of the true theory of the rain, clouds, winds or currents of the atmosphere, and conditions of climate—trade winds, storm, and thunder, their course explained—climate as connected with the geographical distribution of animals and plants clearly accounted for. I here introduce the author from whom I quote to my readers. He observes—

“From the different parts in nature assigned to electricity and magnetism, however, and that the former is esteemed to be the source or principle of *fecundity*; and the latter, when not united with electricity, being esteemed to be the principle of *sterility*; which is sufficiently illustrated by electricity being identified with summer and the lower latitudes, or the season and regions of *production*; and its opposite, magnetism, with winter and the arctic regions, or those of *unproductiveness* and *sterility*; these forces being, in reality, the personification of

the Persian deities, *Orsmuzd* and *Ahrimane*; or the *Renovator* and the *Destroyer*. Thus, though transferring the vegetable products of more northern regions to those which lie farther south, may have the effect of improving their quality and increasing their productiveness, and consequently that such transfers may be made with great profit to the agriculturist and horticulturist of the south, by its effect of increasing the produce, if not the quality, of their corn and fruit crops, &c., a transfer of the vegetable products of southern skies to the higher latitudes, would, on the contrary, be attended with results altogether different from the former; as from the delicacy of their organization, they require at least the same force of the solar action as what they have been accustomed to; insomuch, that when by such transfer they are curtailed in the amount of this sustaining principle, and exposed to a more powerful action of the opposite, or magnetic force, they are found to languish, and if not protected by artificial means, they finally perish. Thus showing, as these facts do, how extensively useful these discoveries in meteorology may be to different branches of the physical sciences, independent of their connexion with the seasons and weather.

“For, from the bodies of animals and plants being exposed to, and acted on, by the electric and magnetic forces in the atmosphere (from which they derive so large a portion of their pabulum), it is natural to conclude that they imbibe and *incorporate* these forces, in the same proportions in which they exist where placed. ‘Si le vent du midi souffle,’ observes a certain writer, ‘les brebis font des femelles; si le vent du nord, elles font des mâles.’—If the wind blows from the south the ewes will have females, if from the north, males.—And consequently, that the constitutions of animals and plants may be regarded to a certain extent, as the counterparts of the conditions of climate existing in the regions where they were originally found, and of which they are natives,—which, if correct, would account for the fevers and other diseases of climate, consequent on changing from cold to warm countries; till by exposition and habit, the constitution becomes accustomed to the change. Such diseases being esteemed effects of the increased action in the circulation, incident to the magnetic ground in such constitutions being exposed to a more powerful degree of the solar or electric action in the atmosphere, than what it had been accustomed to. And if, on the other hand, we suppose *cold*, and diseases of the lungs brought on by cold, to be effects resulting from the exposure of the body to a too powerful operation of magnetic action in the atmosphere, or of its—by being exposed to wet, damp, &c.—imbibing too large a proportion of magnetism. We are thence enabled to see—as man has with some reason been called a *microcosm*,—why persons so affected derive advantage from changing to a warmer sky; simply by the effect of the latter, in gradually ridding the constitution of the redundancy of the magnetism with which it was charged, and in replacing it with electricity, of thus restoring to it the just internal equilibrium of these forces, in whose loss the disease originated.”

The talented author next explains the connexion of meteorology with the seasons and changes of weather, into which I shall not enter, as foreign to the nature of this work; but the learned and scientific reader

must agree with me in opinion, that the preceding conclusions are in strict accordance with the received doctrines of human physiology and pathology, and well worthy of his mature consideration. It is true that no human being knows how life is communicated by any class of animals to its offspring, and that no one can pretend to explain its transmission by the human species to the ovule or embryo, no more than it can be explained how it ceases by death.

Nevertheless, the immortal Harvey ascribed its transmission to what he compared to magnetic influence—*Exercitationes de generatione animalum, quibus accedunt quædam de partu, de membranis ac humoribus uteri, et de conceptione*,—while later physiologists attributed it to electricity, which more consider identical with, if not really, nervous power.

The investigation of the mysterious function of reproduction in all organised beings, has occupied the mind of man from the earliest age to the present, but all the efforts and researches of ages have been hitherto unsuccessful in explaining it. We are ignorant of the manner in which life begins or ceases. Most physiologists, it is true, have only considered this question as regards the human species, and some of the inferior animals; but it is evident that the generation of plants and polypi, of the oviparous and viviparous animals, and of all that enjoy life, belong essentially to the same principle, because nature is always conformable to herself in all her works, and no one can admit several causes for the same effect. It is, therefore, necessary to have recourse to some general principle.

Primitive Generation of the Universe.—There is but one primitive generation of the universe, that is, the creation of living organised matter by the hand of the divine Creator. That which we term generation is but an eternal emanation from this source—a continuation of the arrangement of each organised species—a perpetuity of the vital power. There is no new generation at present, but the continuation of that which has existed for ages, as we only observe, but the successive, and always similar modifications in the same order of matter. Each individual reproduces as it has been produced itself: life gives to organised bodies a tendency to regenerate, as gravitation gives to bodies a tendency to approach the centre of the earth. Organised beings have not an isolated or independent existence, they are always under the hand of nature, which so transforms them, that generation and nutrition are only the transition from one state of life into another. All organised matter is subject to this law; a dead body is not entirely deprived of life, as it is capable of sustaining and nourishing the life of animated beings, of which the dead bodies of animals and plants are examples.—(See account of the “signs of real death” in my Medical Jurisprudence, second edition, 1836).

This power of life is not confined to a particular individual, but to the species, and to organised matter in general. Individuals possess it momentarily, they enjoy it for the purpose of transferring it to others; so that each animal and plant do not live for themselves alone, but for organised matter in general, which alone possesses life,—they enter but as integrant parts of the whole general vitality of all organised matter. It is evident that every animal and plant have derived their vitality

from their parents, and these from their ancestors, retrograding in succession to the creation of organised matter by the SUPREME BEING. Generation is, therefore, not a particular phenomenon, but a universal law of all organised matter.

The conclusions of Pythagoras, Empedocles, Hippocrates, Aristotle, Galen, and all their eminent successors to the time of Harvey, were unsatisfactory. These ancient philosophers fruitlessly attempted to explain the generation of plants and animals, with a view of illustrating that of the human species. But the observations and researches of the celebrated Harvey, led him to the conclusion, now universally received, that all animals and plants, or all organised beings, are generated from an egg or seed—*omnia ex ovo*. This was confirming the opinion of Fabricius ab Aquapendente, that most animals, both terrestrial and aquatic, were produced by oval generation. “*Amplissimam autem esse formationis foetus ex ovis contemplationem, ex eo patet, quod maxima animalium pars ex ovo gignitur. Nam ut insecta ferme omnia, et imperfectiora omittam animalia, quæ ex ovo fieri, sensui apparet; ex perfectioribus quoque maxima pars ex ovis gignitur. Ad hunc censem refert, pennata omnia; pisces quoque (præter sola cetacea), item crustacea, testacea, et mollia omnia; ex terrestribus reptilia, multipedia, et serpentia omnia; atque inter quadrupedia omne lacertorum genus.*” The illustrious Harvey advanced further, not only including all animals, but all vegetables. He observes, in the first exercitation of his great work on the Generation of Animals, already mentioned, “*Nos autem asserimus (ut ex dicendis constabit) omnia omnino animalia, etiam vivipara, atque hominem adeo ipsam ex ovo progigni primosque eorum conceptus è quibus foetus fiunt, ova quædum esse; ut et semina plantarum omnium. Ideoque non inepte ab Empedocle dicitur, oviparum genus arboreum.*” (Arist. de Gen. Animal, lib. 1, c. 20). Linnæus subsequently based his splendid classification of plants according to the sexual system, and completely established the truth of the conclusion—*omnia ex ovo*, as regards the function of reproduction, in a great part, if not all, of the vegetable kingdom.

The ancients maintained that the ovum or germ was round, because the Creator made the world of this form, and that all animals were round at first (Aristotle, Hist. Animal, lib. 3, c. 1,) and Vegetables, (Harvey, op. cit. Exerc, lxii) (see *plates 3, 4, 5, 13*). In tracing the function of reproduction in organised beings, we must ascend from the most simple to the most compound of its processes; and finally attempt to elucidate its complicated mechanism in the human species. It is, therefore, necessary to give a brief outline of the generation of plants and animals, previous to the history of this function in human beings.

But a complete history of the generation of the various species of plants and animals, is far beyond the limitation of this work; I must, therefore, confine myself to a description of a few of them, as classified by modern naturalists; plants, zoophytes, and mammiferæ, at the head of which stands the human species. This was the plan adopted by the illustrious Harvey in his work on Generation.

Reproduction.—Reproduction is the function peculiar to organised or

living beings, which enables them to perpetuate their species. Organised or living beings are plants and animals, every one of which derives its origin from a being exactly similar to itself, and is produced by generation. It is from this function, that the life and organisation of all animated beings emanate.

The inorganic bodies do not engender; they have neither races, families, nor species; they do not receive any thing from bodies like themselves, and always remain of the same primitive nature.

All matter in the sublunary portion of the universe is divided into two great kingdoms, which comprise all beings and productions.

1. *Organic bodies*, which are plants and animals.

2 *Inorganic bodies or inanimate matter*, which is the base of the terrestrial globe, of fossils, water, and air.

The first, or animated kingdom, is composed of beings which are born, nourished, developed, and which engender and die. An animal and a plant succeed each other without ceasing—a mineral or a stone is contemporaneous with all ages. As it cannot live, it cannot die. All its parts subsist without dependence on each other, and obey the physical, chemical, and mechanical laws of inorganic matter.

A plant or an animal is composed of parts or organs, which cannot subsist separately. The principles of its existence and the germs of its destruction, are in itself; but a mineral does not possess the principles of individual existence; it subsists by the laws of inorganic matter, while all its changes or alterations do not emanate from itself, but depend upon the external powers that surround it.

Reproduction is the force of life or organisation, the source of communication of the living principle. The vivifying power of organic beings is an emanation from the DIVINITY; “in him we live, move, and have our being:” in *Deo vivimus, movemus, et sumus*; and on HIM alone depend the laws of inanimate matter.

“Superior itaque ut diximus,” truly observes Harvey, “et divinius opifex (quam est homo) videtur hominem fabricare et conservare; et nobilior artifex (quam gallus) pullum ex ovo producere. Nempe, agnoscimus DEUM, creatorem summum atque omnipotentem, in cunctorum animalium fabrica ubique presentem esse; et in operibus suis quasi digito monstrari: cujus, in procreatione pulli instrumenta sint, gallus et gallina. Constat quippe, in generatione pulli ex ovo, omnia singulari providentiâ, sapientiâ divinâ artificioque admirabili, et incomprehensibili, exstructa ac efformata esse. Nec cuiquam sanè hæc attributa conveniunt, nisi omnipotenti rerum principio; quocunque demum nomine id ipsum appellare libuerit: sive *mentem divinam* cum ARISTOTLE; sive, cum PLATONE, *animam mundi*, aut cum aliis, *naturam naturantem*; vel, cum ETHNICIS *Saturnum*, aut *Jovem*; vel potius (ut nos decet) *Creatorem* ac *Patrem* omnium quæ in cœlis et terris; à quo animalia, eorumque origines dependent, cujusque nutu, sive efflato, fiunt et generantur omnia. Omnia vero corpora naturalia, summi ejus numinis et opera sunt et instrumenta.” (Op. jam. cit).

The Divine Spirit of the universe was likewise recognised by the sages of all ages and nations, as well as by the poets:—

“ Principio cœlum, ac terras, camposque liquentes,
 Lucentemque globum Lunæ, Titaniaque astra
 Spiritus intus alit, totamque infusa per artus
 Mens agitât molem, et magno se corpore miscet.
 Indeque hominum pecudumque genus, vitæque volantum,
 Et quæ marmoreo fert monstra sub æquore pontus.
 Igneus est ollis vigor, et cœlistis origo
 Seminibus.”

VIRGIL. *Æneid*, vi.

One of our sweetest poets has also sung the sentiment.—

* * * * * “What but GOD?

Inspiring GOD! whose boundless spirit all,
 And unremitting energy, pervades,
 Adjusts, sustains, and agitates the whole.

THOMSON. *The Seasons*.

Life, organization, and reproduction, cannot be separated without their destruction. No inorganic body is susceptible of organization, of life, or reproduction. Every plant and animal possess these properties; they have received them from their parents, and transmit them to their descendants. The more powerful the generative power, the more energetic is life; and the more life is communicated by generation, the more it is abridged. It is for this reason that amorous excesses impair it, and accelerate its annihilation.

Plants and animals reproduce because they are destined to die; but minerals do not possess this power, because they are indestructible. Thus we observe that all organized bodies are destructible, and reproduce their species. They die, and become the nutriment of successive generations. The bodies of men entombed in the earth, furnish abundant nourishment to worms and plants. These, in their turn, become the food of other species, so that all change to change again. They die but to live under other forms. The brilliant flower enriches itself with nutrition from the dead matter beneath the root from which it grows. The function of reproduction is therefore peculiar to organized beings, or to the animal and vegetable kingdoms.

The age of life at which generation can be best accomplished, is from puberty to senescence, and this is the most energetic period. This faculty is possessed by all animals from the lowest to the highest. It is in the vigour of life that individuals produce the most robust offspring; but there are some few exceptions. The love of offspring is wisely implanted in all animals, and has been characterised the generative Venus by the ancient poets.

“ Illecebris tuis omnis natura animantûm
 Te sequitur cupide, quoquamque inducere pergis.”

LUCRETIUS, *De Rer. Nat.* Lib. i.

Generation is the same to all—it conquers all—love is the same to all—*amor omnibus idem—omnia vincit amor*. Nature has given pleasure to all animal beings for their individual propagation.

“Behold,” says the eloquent Virey, “what pomp, what joys, what glory, and what magnificence, are prepared by nature, for the marriages

of plants and animals ! How the lion and the bull pride themselves on their strength ! the antelope on its figure ! the peacock and swan on their plumage ! the fish on its silvery coat, and on the splendour of the gold and brilliant appearance of its body ! How the butterfly expands its diamond wings ; how the flower displays its charms to the rays of Aurora, enjoys in silence, and drinks the pearly drops of the dew ! All is the radiance of beauty in nature ; the earth, covered with verdure, resounds with accents of joy and sighs of pleasure : all exhale love, all search for it and enjoy it—in a word, it is the common festival of beings. But, in a short time, the flower fades away, and languishes on its stem ; the butterfly declines and dies ; the lion and the bull, as if fatigued by long contested fights, search for peace and retreat ; and man himself, overcome with languor, retires in silence, full of recollections and sadness, remembering the approach of death, which presses its iron hand on all that breathes.” (Dict. des Sciences Med. *Art.* Generation).

Reproduction consists in the growth of an ovum, egg, germ, seed, or embryo in a living part, from which it is separated when capable of independent existence. The females of plants and animals supply the germs, the males secrete a fluid which, placed in contact with these, fecundates or vivifies them.

The modes of generation in all organised beings may be reduced to three. 1. Oviparous, or those that in general engender by eggs, or ova, as reptiles, fishes, insects, certain worms, birds, and plants in general. 2. Viviparous, those that suckle—cetaceæ, quadrupeds, and the human species. 3. Gemmiparous, or those that engender by prolongations, sections, or offsets, as zoophytes, polypi, infusorial animalcules, and plants that are not annual. Plants and animals must acquire perfect development before they can properly reproduce their species. It is at the period of puberty that they acquire an excess of vitality, which endeavours to communicate itself externally. The epoch is, as already stated with respect to the human species, accelerated by heat, nutriment, &c., and it is equally affected by these causes in the inferior animals and plants.

Organised beings have three periods of life—youth, the age of generation, and senescence, or the epoch of sterility. It is too well known that the human species often abuse the generative function ; they consume their vitality, exhaust themselves, and often induce premature old age or death. It is also a fact attested by Harvey, that even some birds and other animals destroy themselves in the same manner.

The puberty or flowering of plants occurs at a certain season, in which the generative function is also most exerted by animals ; this is spring, so graphically described by poets, philosophers, and physiologists.

“ Vere tument terræ, et genitalia semina poscunt.
Tum pater Omnipotens fœcundis imbribus æther
Conjugis in gremium lætæ descendit, et omnes
Magnus alit, magno commistus corpore, fœtus.
Avia tum resonant avibus virgulta canorus ;
Et venerem certis repetunt armenta diebus.”

VIRG. *Georg.* ii.

Truly has this poet sung: "In spring the lands swell, and demand the reproductive seeds. Then the omnipotent father Æther descends in fructifying showers on the bosom of his joyous spouse (the earth) and great himself, mingling with her body, nourishes all her offspring. Then the shrubs resound with tuneful birds, and animals reproduce their species."

Aristotle had also eulogised spring as the genital season of plants and animals, (De Gen. lib. 2, c. 10), and Harvey thus beautifully described it:—"Ideoque Vere vigent, vernantque omnia; (appropinquante scilicet Sole, qui communis pater est, et genitor; vel saltem summi Creatoris in generatione immediatum et universale instrumentum) non solum plantæ sed etiam animalia: nec minus illa, quæ sponte proveniunt, quam quæ maris fœminæque mutua opera progenerantur. Tanquam adveniente nobili hoc astro, de cælo delaberetur *alma Venus, Cupidinisque Charitumque choro stipata*; cunctaque viventia, blando amoris cæstro ad perennitatem sui existimaret. Vel (ut est in fabulis), quasi eo tempore *Saturni* genitalia in mare projecta, spumam excitarent, indeque nascitur *Aphrodite*. Nempe, in generatione animalium, *superat* (ut Poeta ait) *tener omnibus humor*, spumant, turgentque semine genitalia."—(Op. cit. See also Hippocrates.)

The sun and man generate man, because at the approach and recession of the sun follow spring and autumn, in which the generation and destruction of animals happen. Aristotle held, "Sol et homo generant hominem;" but he ought to have extended his axiom—Spring and organised beings generate their species. Let us hear the philosophical and eloquent Virey on this season:—

"When the vernal sun sheds the spirit of heat and life on the atmosphere, the earth ferments and covers itself with the varied productions, the tree shoots forth its buds, the plant expands its flowers, the benumbed insect revives and seeks its kind, the bird calls its species on the solitary branch, and exhales its amorous delirium in its songs; the quadruped, whose eye sparkles its ardour, darts its glances towards its companion, and thrills with love; but winter, crowned with hoar-frost, brings sadness and the stillness of death upon the earth. In those climates in which the fecundating heat of the atmosphere never ceases, the flower replaces the fruit which ripens and falls, the nestlings of birds succeed each other, generations call forth new generations. The year is one perpetual succession of life, all the beings do not appear to exist in these happy contrarities, but to perpetuate in the bosom of pleasure. Life passes now more rapidly, because it is most consumed."—(Op. cit.)

The sexual organs enlarge both in plants and animals during the season of reproduction; and they are destroyed in the former, and are collapsed in the latter, before and after the function is performed. It is also remarkable that the female organs in both classes of beings are internal and recipient, and the male are external and intromissive. Vegetables lose their sexual organs after reproduction, and have them renewed every year; but animals preserve those they have received, and these have periods of repose as well as of activity.

The sexual organs differ in different classes of plants and animals. Some are agamous, or asexual, as mushrooms, algæ, &c. among plants,

and zoophytes, ceratophytes, corals, most of the infusoria, polypi, and echinoderms among animals. There are ova or eggs, even in some of these genera, and others propagate by divisions, sections, or offsets, as polypi, certain worms, and some of the infusoria. In other species the sexes are present in one individual, either conjointly or separately. Those which have both sexual organs are plants which possess stamens and pistils; and animals, as bivalve and multivalve shell-fish, certain worms, infusoria, &c. The species which have the sexual organs separate are monoicous plants, as maize, amaranthe, cucumber, &c.; the univalve shell-fish, certain worms, &c.

The greatest portion of organised beings have the sexual organs in different individuals, and these engender from puberty to senescence, unless affected with congenital vices of conformation, or with diseases which cause infecundity.

The following table shows the preceding differences in the reproductive organs of animated beings.

Capable of Engendering.—I. Without sex; the algæ, mushrooms, &c.; most of the zoophytes, imperfect animals, and infusorial animalcules.

Capable of Engendering.—II. 1. Reunited hermaphrodite plants, bivalve and multivalve, shell-fish, worms, &c. 2. Separate hermaphrodites, monoicous plants, univalve shell-fish, worms, &c.

Capable of Engendering.—III. One sex in male or female—dioicous plants, invertebrated animals, crustaceæ, insects, cuttle-fish, &c.

Incapable of Engendering individually.—IV. 1. Null, or incomplete sexes—bees, ants, &c.—natural or artificial eunuchs. 2. Inactive sexes, as in extreme infancy, and senescence of all beings, and during certain diseases.

The season of rut or amorous impulse, is to animals what floration is to plants. The maturity of the fruits and seeds of these is analogous to the time of gestation and incubation with animals.

Males in general, except man and a few animals, do not ardently love their females, but the germs of the offspring of which they are the depositories; and they do not incessantly seek them after impregnation. Man looks on a blooming girl in the prime of life, on a pregnant woman, and on one beyond the age of reproduction, with very different emotions. Among the inferior animals the females are seldom sought for, after conception, by the males. It is also well known that effeminate, impotent, or castrated individuals, inspire contempt, and not love. It is likewise a general law, that animals and vegetables which are too old, are dead to reproduction.

Organised beings are powerfully affected by propagation; animals become depressed and dejected, and plants are deflowered and generally wither. The season of coupling with animals is a period of strife, and the most robust prevail, and maintain the vigour of the species. Animals are agitated and restless in the season of reproduction, their cries and accents announce their wants, and they seek each other. It is also remarkable that the amorous instinct of females of all animals leads them to prefer the most vigorous males. The feebleness of the one aspires after the strength of the other, and the vigour and impetuosity of the passions announce the capability for generation. If we

examine the human species, we find that physical beauty is generally preferred to other considerations, though there are many exceptions. It often leads our nobility, and indeed all classes of society, to contract unequal marriages. Nature directs the physical, moral, and intellectual faculties to the perfection of generation. The attachment of the world, the laws of society, human conventions, in fact, every consideration must yield to it, with very few exceptions.—“Love conquers all, and all must yield to it.” “*Omnia vincit amor, et nos cedamus amori.*”

There is such a unison of sentiment, such a predilection between certain individuals, that they prefer each other to all the rest of the world. These relations of sympathy are generally the result of a harmony of age and character, and of the correspondence of the moral states or individuals. It is true that many other motives lead to conjugal alliances; but such unions are, for the most part, unhappy. The human species have, after the age of puberty, a presentiment of generation, even before they have a knowledge of its pleasures—*mentem Venus ipsa dedit*. The pleasure which nature joins to sexual union is an attraction so imperious and tyrannical, as to be required as powerfully as any other want; and the inferior animals are impelled to it by an instinct even stronger than life; *in furias ignesque ruunt, amor omnibus idem*. This is modified by education, as well as by customs of society in our species. Harvey observed that many birds, insects, and fishes, produce eggs without the intervention of the male, but these are infecund. Such animals are often affected with disease and perish. He continues to remark, that the human female, if deprived too long of the sexual rights, may become affected with hysteria or nymphomania. “*Omnia siquidem animalia, cupidinis œstro percita, ferociunt; et nisi se invicem fruuntur, plurimum tandem à consuetis moribus recedunt. Ita mulieres quædam insaniunt præ desiderio consuescendi cum viris; et in nonnullis usque adeo sævit hoc malum, ut vel veneficio afflatæ, vel sideratæ, aut à cacodæmone obsessæ judicentur. Idque sæpius contingeret, nisi proba educatio, bonæ famæ reverentia, et innata huic sexui verecundia, inordinatos hosce animi impetus compescerent.*” (Op. cit. Exer. cit. v.) Every observant individual will assent to the validity of these conclusions, as daily observation must convince him of their accuracy. It is scarcely necessary to refer to duels, actions for divorce, and even murders caused by sexual impulse, which of late are of such frequent occurrence; so that the passion of love is often as imperious in our species, when the human mind is uncultivated or badly regulated, as in the inferior classes of animals. It gives rise to quarrels and dissensions among men, and has always done so, according to Horace:—

“*Nam fuit ante Helenam * * * teterrima belli causa.*”

Much other evidence might be adduced to prove, that women were the cause of most sanguinary wars, and of strife and dissensions. Even in these days, actions for divorce, adultery, and prosecutions for the murder of husbands and wives, are by no means unfrequent in the courts of justice, in all countries. Such are a few of the evil results of the reproductive function among all classes of society, both civilized and savage.

GENERATION OF ORGANISED BEINGS—EFFECTS OF PHYSICAL POWER
ON OFFSPRING—SONS OF GREAT MEN UNLIKE THEIR FATHERS.

The moment of sexual union is preceded by caresses among apes, pigeons, doves, &c.; and some animals, as bats, apes, porcupines, whales, &c., copulate abdomen to abdomen, whilst others perform the function like quadrupeds. Dogs, wolves, and foxes, remain in close union, as the bulb of the penis swells considerably, and is compressed by the contraction of the vagina, so that the male organ is arrested during the secretion and ejaculation of the semen; and this adaptation is necessary in these animals, because they are deprived of seminal receptacles, secrete sperm only during copulation, and their seed cannot be injected at once into the uterus, but drop by drop. If they are separated at the moment of this slow ejaculation, the female will not be impregnated.

The moment of ejaculation in mammiferous animals is accompanied by universal excitement of the whole body, a kind of slight convulsion, which terminates in a kind of comatose or extatic state. Coition has been compared to a fit of epilepsy, to an electrical shock; it entirely engages the mind and body; we neither hear nor see; the soul is absorbed in love; and some persons have even lost their lives in this crisis. It is for this reason that sexual intercourse has proved mortal after severe wounds, hæmorrhages, &c.; and when too often repeated, injures the whole economy. It is therefore wise to reflect and think before we engender, as we are about to impart life, and to shorten our own existence. If the whole mind is not absorbed in the act of generation, the product will be feeble and delicate, as we usually observe in the infants of men who make great mental or corporeal exertion. The sons of celebrated men are generally inferior to their fathers. We seldom, if ever, see great men engender great men. The sons of Socrates, Hippocrates, Chrysippus, Pericles, Thucydides, and Cicero, among the ancients; of Racine, La Fontaine, Henry IV. of France, Napoleon, John Hunter, Cullen, and a host of others, that might be cited among the moderns, did not equal their fathers in talent.

Most of the men, on the contrary, who became illustrious by character, genius, or valour, were the fruit of ardent and vigorous, or illicit love, and the sons of parents who were only remarkable for physical strength. Many celebrated men were illegitimate, and were the sons of early and ardent love—*fortes creantur fortibus*—though there are exceptions when the strong are enfeebled or aged. Aristotle inquired why delicate offspring, deformities and monstrosities were more common in the human species than in other animals; and he believed the cause to be, that our species generally perform the act of generation negligently, and have their minds filled with other matters at the time; while the lower animals perform the function more vigorously, and give themselves entirely to it. It is, perhaps, for this reason that common people, or those residing in the country, who are generally robust and vigorous, beget the finest and strongest infants; because they follow nature's dictates more closely than the great of the age, or the enfeebled citizens, who are depressed by passions, anxieties, and troubles, and whose minds

are absorbed in difficult affairs, or abstract studies. It will be admitted by all, that few of the human species have the mind solely intent on reproduction, but on physical pleasure, or, as Harvey observes, "*Mas in generando, nec consilio nec intellectu utitur.*" (*Exercit. L.*) "Man in generating, neither uses deliberation nor intellect."

It is believed by some, that if the mind is fixed on a certain individual during coition, the offspring will resemble such person. "*Verum est quod si mulier sit juvenis cum in coitu sit memor si vel viri, vel alterius et proprie diffundit generativum: genitus erit omnino similis et jam probatum millies et in animalibus.*" It was held by the ancients, that an adulterous infant may on this ground resemble its reputed father. It was for this reason, that some of the people of the Eastern nations caused their wives to look on pictures of athletic persons during the act of reproduction. These opinions have, however, been long exploded, although some importance is still attached by most persons to family resemblances. Dr. Gregory maintains, in his *Conspectus Medicinæ Theoreticæ*, that children often resemble their parents, and are certainly like them, not only in features, but in form, mind, virtues, and vices. Dr. John Gregory, the father of the last-named distinguished author, makes the following remarks in his *Comparative View of the State and Faculties of Man with those of the Animal World*:—

"Thus, by a proper attention, we can preserve and improve the breed of horses, dogs, cattle, and indeed of all other animals. Yet it is amazing that this observation was never transferred to the human species, where it would be equally applicable. It is certain, that notwithstanding our promiscuous marriages, many families are distinguished by peculiar circumstances in their character. This family character, like a family face, will often be lost in one generation and appear again in the succeeding. Without doubt, education, habit, and emulation, may contribute greatly in many cases to preserve it; but it will be generally found, that, independent of these, nature has stamped an original impression on certain minds, which education may greatly alter or efface, but seldom so entirely as to prevent its traces from being seen by an accurate observer. How a certain character or constitution of mind can be transmitted from a parent to a child, is a question of more difficulty than importance. It is, indeed, equally difficult to account for the external resemblance of features, or for bodily diseases, being transmitted from a parent to a child. But we never dream of a difficulty in explaining any appearance of nature, which is exhibited to us every day. A proper attention to this subject would enable us to improve not only the constitutions, but the characters of our posterity. Yet, we every day see very sensible people, who are anxiously attentive to preserve or improve the breed of their horses, tainting the blood of their children, and entailing on them, not only the most loathsome diseases of the body, but madness, folly, and the most unworthy dispositions; and this too when they cannot plead being stlaimuted by necessity, or impelled by passion."

I was consulted by a surgeon of veracity about a case of a most distressing nature. His patient was the lady of a gentleman of great wealth, and the mother of ten children. Twelve years before I was applied to,

she received the addresses of a married man, who while she was in a state of faintness was intimate with her. In nine months afterwards she was delivered of a daughter, now twelve years old, having a close resemblance to the mother's paramour. The mother was miserable having dishonoured her husband, threatened to commit suicide, or inform her husband. I was consulted to know my opinion as to the possibility of the girl being legitimate, supposing the mother had fixed her mind on her lover, while with her husband, as I had recorded the possibility, according to ancient and modern authors, that such was said to be the case. I did not presume to determine the question; although I certainly have known two cases, in which the children bore a most remarkable resemblance to persons not the parents.

It has been long observed, that men of genius were the first born, because the first love is in general the most ardent; and hence the Asiatics have always maintained that their greatest legislators were born of virgins, as Zoroaster, Confucius, Mahomet, Vistnou, Zacca, &c.; and we shall also presently observe, that others were engendered not in married state, but by the force of love alone. Such was a great number of the heroes of antiquity, who, for this reason, were said to be descended from the gods, as Hercules, Esculapius, Romulus, &c.; such also were other illustrious bastards, as Homer, Gallileo, Cardan, Erasmus, &c. Even the poets entertained this opinion, and the immortal Shakspeare thus alludes to it, when he makes Edmund say—

“ Why brand they us
With base? with baseness? bastardy? base? base?
Who, in the lusty stealth of nature, take
More composition and fierce quality
Than doth, within a dull, stale, tired bed,
Go to the creating a whole tribe of fops,
Got 'tween sleep and wake.”

William the Conqueror was named the Bastard, as he was the offspring of a left-handed marriage (*pour un séjour*) which allowed nobles to marry an inferior for a certain time, but to wed an equal for life.

Prolonged continence produces analogous results to the preceding. The father of Montaigne returned after thirty-two years from the wars of Italy, was during that period strictly continent, and then begot his celebrated son.

Persons of strong and sound constitutions beget healthful infants, while those who make excessive mental or corporeal exertion have generally feeble offspring. It is for this reason that simple, stupid villagers, generally beget infants of high physical and moral powers; while men of the greatest genius, who over-exert their mental faculties, often engender but idiots or pusillanimous infants, but there are many exceptions. Thus, by a protracted continence or a purity of morals, the species are improved and strengthened both in mind and body. Virtuous parents concentrate all the energy of their minds in abandoning themselves to the views of nature. They engender a posterity, by whose talents the pride and glory of their progenitors will be maintained. Thus it is, that after many progressive and virtuous generations, we see

families ennoble themselves and flourish; but by a subsequent incontinence they fade and degenerate. The nobility of France, Spain, Portugal, and other nations, who intermarry among themselves alone, so as to maintain their caste, have long been remarkable for the degeneracy of their offspring, which often leads to adulterine bastardy. The Jews, who intermarry among themselves, are considered to be degenerate, and are remarkable for a peculiar cast of countenance.

It must be manifest that individuals resulting from a love which is languid, or in old age, or cold and enfeebled by excessive enjoyments, not only among men, but even among animals, are feeble and debilitated, and without any remarkable faculties. The enervated offspring of the aged bear the same evidence. M. Thierry remarked, that infants contaminated with syphilis, were less fecund than those of a sound constitution. (*Observ. de Physiq. et de Med. en Espagne. Paris, 1791*). It is also well known that parents contaminated with ill-cured syphilis to a certain extent, often beget infants which are born dead, and decomposed between the seventh and eighth month of pregnancy; and that the disease in question is a common cause of premature parturition. Several cases of this kind have fallen under my observation; and in some of these there was the greatest mental distress on account of the want of offspring. It does not, however, follow that every man infected with syphilis in a secondary or chronic form, begets infants that perish in the last months of pregnancy, as it requires a certain degree of contamination to cause this result; for when the taint is slighter, infants are born alive, but weak and delicate, and either covered with a copper or dark-coloured eruption about the genitals and thighs, at birth, or soon afterwards. I have fully described syphilis in infants, in my *Lectures on Diseases of Children*, already quoted.

Many animals are attracted by the odours they exhale at the time of rut or season of reproduction; some seek each other by their cries, by which they express the violence of their amorous rage. Harvey has well described this fact:—"Profecto dictu haud adeo pronum est, quomodo vel visu, vel auditu, vel olfactu, mares (etiam è longinquo) intelligent fœmellas cupidinis œstro percelli, coitumque appetere. Aliqui, etiamsi vocem illarum duntaxat audiant, vel locum in quo minxerint, aut vestigia solum olfaciant, statim libidine acceduntur, easdempue ad coitum insectantur. (Op. cit. Exercit. VI.)

Love is more ardent among birds than among quadrupeds, on account of the warmth of their constitution and their extreme vivacity. Their coition is rapid and frequently repeated. A cock copulates with thirty hens in a short time. These birds have not a perfect penis, but a tubercle; there is no penetration, but a simple affrication. Woodcocks and other birds fall into a kind of ecstasy during the season of love. Aristotle observes, "Aves morbo laborare, et interire, nisi parient." (*Gen. Anim. l. 3.*) "Phasianus mas," observes Harvey, "in aviario detentus, adeo flagranti libidine æstuat; ut nisi complures fœmellas, (ad minimum sex) secum habuerit, eas iterato sæpius coitu mala mulctet, et fecunditatem impediatur potius, quam promoveat. Vidi aliquando fœmellam phasianiam; à gallo simul concluso (quem nec occultando sese, neque aufugiendo, evitare poterat) adeo delassatam, dorsoque ob fre-

quentiores ejus insultus deplumem, ut tandem miseris modis exagitata præ mœrore deficeret. In eadem tamen dissecta, ovorum ne rudimenta quidem inveni. Similiter fœmellæ aliquæ, in libidinem adeo proclives sunt, ut mares suos morsinculis, vellicent, (quasi in aurem veneris guadia insusurrarent) supersilient, aliisque artibus ad coitum invitent; in quo numero sunt columbæ et passeress." (Op. cit. Exer. VI.)

The mewling of cats, the lowing of quadrupeds, and the cackling of birds after they have laid their eggs, are familiar examples of solicitation of the male animals to reproduction.

It is well known that repeated coition within a short time—for example, a few hours—by the same male, is invariably infecund; and that offspring is produced when moderation and abstinence are observed. There are some few exceptions, more especially the ram, which I have been credibly informed, will impregnate from thirty to forty ewes in one night. I have received this information from very large and wealthy gentlemen, sheep-farmers in the Highlands of Scotland, whose flocks number from ten to twenty thousand.

Cold-blooded animals, as lizards, serpents, &c., have a slow copulation and remain several days in it. They are in a state of stupor and insensibility; they neither eat nor stir during the time.

The genital organs of both sexes of animals become congested and hot during coition, and the temperature of these organs in plants is considerably augmented—a fact ascertainable by the thermometer.

The fervour of love is much greater in males when they have a great number of females; and thus polygamous are more ardent than monogamous animals: but there is some reason to doubt this assertion, as the offspring is chiefly female. There is a kind of modesty in females which leads the males to search after them, and excites amorous impulse. The sexual unions of quadrupeds are generally vague, and the most vigorous males prefer the most vigorous females. Thus, we often observe small bitches in copulation with large males, as if instinct had much more regard to the perfection of the species, than to the pleasure of the individual. Monkeys are monogamous, but they do not always confine themselves to the same females. Ruminating animals often fight for their females. It has been recorded that sea-calves have their seraglios, which they stoutly defend against intruders.

The pairing and care of progeny of animals is beautifully described by Lord Kames in his *Sketches of the History of Man*, and is well worthy of perusal. See also M. Girou de Buzaringues *De la Generation*, 1828, in which there is a vast deal of information on the breeding of animals. Baron Cuvier observes in his analysis of the *Trans. of the Academie Royal des Sciences* for 1827:—"The curious experiments of M. Girou de Buzaringues on the procreation of the sexes are not only important to agriculture, but also to general physiology. The sex of the offspring depends upon the greater or less vigour of the parent. When it is desirable to have a greater number of females, young males should be preferred, and females of advanced age, and to nourish these more abundantly than the former. It will be necessary to adopt the inverse plan to produce most males."

Animals generally confine their amours to their own species—similia

ex similibus, augeri necesse est—(Arist.), and do not copulate, except in the season of reproduction ; and hence their unions are almost always fecund. The human species often abuse the function of generation, by attempting to engender at all times, and too frequently. In such cases the semen is suddenly secreted. It is thin and watery ; it is not allowed to accumulate for six or eight days in its receptacles, in which its thinner parts become absorbed, and then it is rendered prolific and properly elaborated. (Harvey, Exercit. L.) The spermatic fluid ought to remain for one or more days in its receptacles, to be prolific, and the longer it is retained, the more fecund will it become. “Item dicimus de coitu virtuoso et de generatione creaturæ, quod vir non debet coire recenter, neque mulier spatio octo dierum. Sciendum est, quod quanto magis sperma utriusque fuerit servatum tanto et producturæ ; et si sperma ex bonis cibis fuerit generatum tanto magis erit digestum et viscosum et virtute plenum.” Infecundity is often caused by a violation of this rule by young persons, and paternity established by its observance. There are, however, exceptions, for I have been lately informed on authority upon which I can rely, that conception has happened after thirty-six hours’ abstinence ; and much will depend on the age, temperament, habit, pursuit, and intellectual and physical states of individuals. But the ancient physiologists were right in their general rule—the longer parties abstain the more quickly they generate ; “Quod quanto plus uterque se abstinere á coitu, tanto citius generat postea coiens. In cases of desire or want of offspring, and in cases of disputed paternity, affiliation and legitimacy, the conclusions just mentioned have much weight in determination of the question at issue. The bastardy and some other sections in the Poor Laws might be changed and improved by medical evidence or opinion as now stated.

Swammerdam and Mr. Hunter concluded that the vesiculæ seminales were not seminal reservoirs, as their secretion differs in colour and smell from that of the testes ; that the former is yellowish and inodorous, while the seminal fluid is whitish, possessing a peculiar odour, similar to that of the orchis root or down of the chesnut. In a man who had but one testis, Mr. Hunter found the seminal vesicle at the opposite side filled with the same fluid as that of the other. The seminal vesicles are wanting in birds, dogs, and other animals, and the bulb of the urethra is said by Mr. Hunter to perform their office in man. This conclusion is opposed to the received opinion, and almost all physiologists now agree, that retention of the semen in the vesicles for one or more days, or abstinence from coition, is necessary for generation. I might give the histories of many cases of healthful individuals who have consulted me on account of want of family, which entirely arose from too frequent intimacy. Such cases require great delicacy in their investigation ; but it is not difficult to learn their nature, when science, caution, and sympathy are duly exerted. Conjugal, domestic, and social inconveniences, must be always prevented or removed, and I need scarcely observe, that excessive sexual enjoyment relaxes both parties. The contractile power of the vagina and uterus almost always obviates relaxation in the human subject, unless when the organs suffer from mucous and

other discharges. In the latter cases, the male semen is often too much diluted and rendered unprolific.

Most animals after impregnation refuse to admit the male, but mares, rabbits, hares, &c., are exceptions. In many insects one copulation fecundates several eggs, which may engender nine successive generations, all of which are females, except the last, which contain males. Thus, an insect may be a mother and a virgin at the same time. Jurine informs us that the *monoculus aphid* produces fifteen generations without copulation. It is also a fact, that in the *monoculus pulex*, the young in the summer months are propagated viviparously, or born alive, and in the autumnal or cooler months oviparously; some are winged, others have no wings, or even a distinction of sex.

Animals and plants which procreate from divisions, prolongations, or sprouts, have no need of fecundation.

There are great differences relative to generation in the various species of animals and plants. Most are fecund, but some are impotent, others on account of malformation or diseases of the organs, which prevent coition. Animals and plants follow the laws of nature, and are generally fruitful. The numerous causes of infecundity in the human species are fully described in my works on Marriage, Prostitution in London, on Diseases of the Genito-urinary Organs, and Medical Jurisprudence.

It would far exceed the limits by which I am circumscribed in this work, were I to enter on the history of generation of the vegetable and animal kingdoms; and this is the less necessary as I have fully described it in my *Lectures on Midwifery*, published in the *London Medical, and Surgical Journal*, 1836. Suffice it now to state, that a sexual system exists in the numerous classes of both kingdoms, and that the phenomena of reproduction is analagous in both. I have traced it from the lowest class of plants to the human species, and given a very full account of it as regards the latter.

I shall now rapidly notice the reproduction of the vegetable kingdom, and pass from that to the mammiferæ, among which is the human species.

CHAPTER V.

GENERATION OF THE VEGETABLE KINGDOM.

THE vegetable kingdom is one of the grand divisions of animated nature, without which animals would have been created in vain, as it affords food, shelter, shade, and comforts to all terrestrial beings. Vegetables are living or organized beings; but distinguished from animals by the want of nerves, muscles, and a digestive cavity; and consequently they have not the power of sensibility, unless contractility and irritability be so deemed; nor of motility nor true digestion. They possess no idea of their own existence, nor of that of those beings which surround

them; they do not stand in need of the faculty of thought, like animals; they remain fixed in the same place during life in which they receive all substances necessary for their growth, conservation, and multiplication. It is easy to distinguish a vegetable from an animal; but when we place certain organized beings of the extremes of the two kingdoms before us, as sponges, corals, &c., the difference is so slight in appearance, that the most celebrated naturalists have hesitated to which division to assign them; and they have often classed them in one group or the other.

Nevertheless, all naturalists now agree, that every being which possesses a digestive cavity, and enjoys voluntary motion, is really an animal; whilst that one is to be regarded as a vegetable which possesses certain movements, without an alimentary canal; such, for example, as the sensitive and some other plants. According to this conclusion, it is easy to fix the line of demarcation between vegetables and animals: thus, the coral is indubitably an animal, because it contracts itself by an act of volition, and possesses an internal reservoir; but a creeping plant is a vegetable, because it has no internal cavity, and no degree of motility.

In all other respects the conformation of vegetables is the same as that of animals, except that they are deprived of nerves and muscles. Their bodies have a cellular tissue for a base, simple in a small number, and transformed into vessels and glands of various kinds, in the great majority.

It is also to be remembered, that the fundamental elements of animals are oxygen, nitrogen, and hydrogen, and of vegetables, oxygen, carbon, and hydrogen, with some others common to both kingdoms.

Vegetables possess the following parts—1. A root which connects them to the soil; 2. A stem which projects into the air; 3. Leaves of different sizes; 4. A pistil or female, and a stamen or male organ of generation; 5. A calyx and corolla, to protect the organs of reproduction; and 6. The fruit which contains the germs of many new plants.

It follows from this arrangement of parts, that vegetables are destined to accomplish two great organic functions, nutrition or self-preservation, and reproduction, or the perpetuation of species.

It is manifestly foreign to the design of these pages, to prosecute vegetable physiology, and to describe the functions of this class of beings, such as nutritive—by roots, stems or branches, shoots, leaves or accessory organs;—absorption, elaboration by sap, assimilation, respiration, or transpiration; but I shall merely confine myself to a very succinct account of reproduction, which peculiarly appertains to that of the animal kingdom.

There are male and female organs in plants, destined for reproduction, as well as in animals. With the exception of a very small number of plants, all vegetables have on the same stalk both male and female organs of reproduction—an admirable contrivance of nature, which thus furnishes to the plant the means of regeneration, as it is compelled to develope, increase, and die in the sun; whilst animals have a muscular system that enables them to move from place to place, (locomotion) and search out each other.

The flower is the part of the plant which contains the sexual organs. These may be separate, and are sometimes united, and the union is called hermaphrodite.

There are certain plants in the 21, 22, and 23rd classes of Linnæus, whose flowers have male or female organs only. Monoicous plants have sometimes the sexual organs situated at a greater or less distance on the same branch. Some, on the contrary, have the male organs on one flower, and the female on another, as in all the dioicous plants; these are termed unisexual, and male and female flowers.

Nature, ever wise in her works, has placed male and female plants sufficiently near to each other, that they may celebrate their amours, and sometimes even by the wings of the wind, or extraneous influences.

The winds transport the pollen to the female organs, as do bees, butterflies, and other winged insects in flying from flower to flower.

The reproduction and perpetuation of plants is not only curious and instructive, but illustrative of generation in the human species.

The flower, the most tender, beautiful, and remarkable on account of its form and variegated colours, is generally composed of four principal parts, of which two are essential to generation—the stamen and the pistil; two others which exist for ornament and protection against external bodies—the calyx and corolla. Such is the arrangement of these parts in proceeding from the exterior to the interior mechanism.

Reproduction of Vegetables—Sexual Organs of Plants.—The calyx is that part which surrounds the flower, varies in colour, consistence, and the number of pieces which compose it, all of which are united at the base. It may consist of one, two, or three pieces, and these are called phyllæ.

The corolla is placed within the calyx, and forms the inner envelope of the stamen and pistil. Linnæus ingeniously compared this to the nuptial bed or the theatre of the amours of plants. It varies in form and colour, and like the calyx consists of one or many pieces. Its use is to protect the interior or sexual organs, and to modify the intensity of the rays of heat at the period of fecundation.

The stamen is the male sexual organ, is the third part of a flower which proceeds immediately from the corolla, and its use is to fecundate the pistil or female organ, which is placed in the centre of the flower. This organ is composed of the filet, anther, and pollen. The filet is not always present, as it is not indispensable to fecundation, but its summit is the anther, without which fecundation cannot occur.

The anther consists of a fine membranous sac, in the interior of which is a very fine powder called pollen. The anther is compared to the glans or head of the male organ in animals, and the fillet to the body of the same organ.

The pollen or seed, consists of very fine grains, in the centre of which there is a subtle fluid possessing a similar odour to the semen of the male animals, and causing fecundation, by its action on the pistil.

Flowers in general have several stamens, and fewer pistils, so that we may fairly conclude that plants are generally polyandrous, that is to say, there are many males or husbands for one female, as among certain

animals, and even the human species in certain Eastern nations, and in a state of concubinage in all civilised countries.

Linnæus based his splendid classification of plants on the number of stamens or vegetable husbands. Thus, his first class is monandria, one stamen; his second, diandria, two stamens; and so on to the eleventh class, dodecandria, from eleven to nineteen stamens; the twelfth, icosandria, from twenty to a hundred stamens; the thirteenth, polyandria, from twenty to a hundred stamens; inserted at the tube of the calyx, which is often united with the ovary; the fourteenth class, didynamia, (two powers), four stamens, two of which are longer than the others; the fifteenth class, tetradynamia (four powers), six stamens, four of which surpass the other two in size.

The stamens, or male organs, are sometimes united in different bundles, which led the illustrious Swede to add four other classes. Sixteenth, monadelphia, one brother, when all the stamens are united into one; seventeenth class, diadelphia, two brothers; eighteenth class, polyadelphia, many brothers; nineteenth class, syngenesia, simultaneous generation, when many stamens are united by the anther, and not by the filets, so as to form a tube which is freely traversed by the style of the pistil; the twentieth class is gynandria, which signifies woman and man, the female and the male—in which the stamens are attached to the pistils.

In fine, there are plants in which the sexual organs are not in the same flower, and these are divided into three classes. Twenty-first class, monoecia, one house or family; twenty-second, dioecia, two families; twenty-third class, polygamia, hermaphrodites in which the male and female organs are united or unisexual; lastly, there is the twenty-fourth class, in which the sexual organs escape detection with the eye, and these are called cryptogamia—hidden marriages.

The female organs of plants are the following:

The pistil is in the centre of the flower, and is the female organ; it is composed of the ovary, the style, and the stigma. The ovary, derived from the word ovum or egg, because it contains small grains, germs, ovules, or rudiments, is the inferior part of the pistil, which is supported by the receptacle or base of the calyx. When incised, or cut transversely, it is found to contain grains, ovules, or eggs.

The stigma is the superior part of the pistil, which transmits to the ovary the pollen or fecundating powder, which contains the subtile fluid of the male organ.

The style, which does not always exist in all plants, is a thread-like canal, situated between the ovary and stigma, whose use is to transmit to the first the fecundating powder.

Though the stamens or male organs are much more numerous than the pistils or female organs, yet, in some plants, the latter exceed the former in number. The number of pistils has served Linnæus for a division of a certain number of these classes into orders.

First order, monogynia, one pistil; second order, digynia; third order, trigynia; fourth, tetragynia, four pistils, &c.

Reproduction—Amours of Plants.—Having succinctly described the

reproductive organs of plants, let us now direct our attention to the mechanism of their functions, which have for their object the reproduction of the species.

The celebrated Linnæus first gave the true physiology of the reproduction of plants. According to him, the flower forms the theatre of their amours; the calyx is considered the nuptial bed; the corolla the curtains; the anthers are the testicles; the pollen the fecundating fluid; the stigma of the pistil the external genital aperture; the style the vagina, or the conductor of the prolific seed; the ovary the womb; the reciprocal action of the stamens on the pistils, the copulation or consummation of the sexual intercourse.

It is only at the period of floration or the development of the flower, that the marvellous unions or marriages of plants occur. The sexual organs of the male and female exhale a spermatic odour, while they become more sensitive, and acquire a degree of action visible to the naked eye. The functions of generation now commence, and are six in number. 1. Sexual approach; 2. Dehiscence or ejaculation of the male organ; 3. Absorption of the prolific pollen or fluid by the female organ; 4. Fecundation; 5. Gestation; and 6. Dissemination or expulsion of the fruit from the ovary.

1. *Sexual Approach*.—When the flower is developed and perfected, the sexual organs act on each other; the male organ (anther) becomes erected, and directs its summit or head towards the stigma (genital fissure) so as to shed on its surface the pollen or prolific fluid.

In some hermaphrodite flowers which have ten stamens, as the fraxinella, ruta, &c., each approaches the female organ, and having shed its seed, resumes its original position, to give way to the nine others, which alternately perform the same function.

The corolla contracts, in some flowers, so as to bring the stamens nearer the pistils; and in aquatic plants, the flowers elevate themselves above the surface of the water, while copulation is effected, and then they plunge again into their former element, and bring forth their fruit. Linnæus observed, that when the stamens were longer than the pistils, the flowers were vertical; when the pistils were longer than the stamens, the flowers were inverted; and when both were equal in length, the flowers were pendent. In this manner sexual approach was facilitated, and insemination effected in all hermaphrodite flowers.

Dehiscence, or Ejaculation of Pollen or Seed.—The pollen of plants is the fecundating power, and consists of a number of small sacs, invisible to the naked eye, in which a fluid exists, which is analogous to the spermatic fluid in animals. The rupture of these sacs is to allow the escape of the pollen, termed dehiscence, and is similar to the emission of seed in animals.

The surface of the stigma (genital fissure in animals), presents a number of apertures, communicating with the ovary, or directly by the filiform (thread-like) canal called style, and which is analogous to the vagina in animals. The ovary in plants, like the uterus in animals, possesses a power of absorption or suction of the male fluid, which it communicates to the ovule or germ. It is the action by which the ovary

draws to itself either the seed, or the vapour arising from it, *aura seminalis*, and which action is termed pollinic absorption. This is analogous to uterine absorption in female animals.

According to the physiology of human generation, the womb absorbs or sucks in with avidity the spermatic fluid, and also that impregnation follows the slightest possible penetration of the virile member, even though the hymen be perfect—(see *Signs of Pregnancy*).

The stigmata of flowers, like the sexual organs of most animals, in the season of amours are bedewed with more or less humidity, acquire more heat, and even become odorous. The stigma in the sensitive plant, tulip, &c., becomes congested and contractile, not only after the application of the fecundating powder, but when submitted to any kind of stimulation. The arum of Italy developed so much heat under the same circumstances, as to be appreciable by the thermometer. We see the female organ in the crown imperial, the laurel of St. Anthony, &c., depress itself towards the male organ, which it surpasses in length. We even observe tremblings in the Parnassus de Marais, when it receives the exciting impression of the fecundating pollen. Erante has beautifully described these phenomena in his delightful work, *de Connubiis Florum*.

“Dat pronubia signum.

Aurora exoriens; fila obriguere; dehiscunt

Folliculi; volat aura ferax tectoque reflexa

Præcipitat perque antra tubæ perque antra placentur;

Ova tument; guadet flos femina prole futura.”

Fecundation—Impregnation of the Germ—Conception.—The seminal fluid of the pollen having been transmitted to the ovules or germs in the ovary, these rudiments of life acquire a new mode of vitality; they rapidly increase, and are transformed into real grains, which are capable of giving birth to new vegetable beings, whilst they are placed in a situation most favourable for germination. Such is fecundation in plants; and it does not differ from what we term conception in female animals.

So soon as fecundation is effected, both the male and female sexual organs of flowers, except the ovary, decay and die, as nature has accomplished her object, and left the elements of future generations for development. The ovary swells, and becomes filled with a fluid, which soon acquires consistence, and finally becomes the fruit. This process is termed fructification. The sexual organs can no longer contribute to the perpetual renovation of the species.

“Reproduction,” says Merat, “is the end of all the cares of Nature, for which she has prepared the most perfect apparatus. The act being finished, all enter into repose, all fade, all vanish. Retard fecundation, impede it by any means, and the flower preserves the freshness of its calyx for a long time.”

Development of the Ovules—Gestation—Pregnancy.—The ovule remains a certain period, as in animals, until it develops, and is transformed into grains, which are capable of giving birth to new individual

vegetables. We shall see, in studying the fruit, the processes employed by nature to effect this object.

Dissemination—Dehiscence—Parturition.—These terms are synonymous, and mean the escape of the grain from the fruit, and are analogous to parturition in animals.

Fructification—Analysis of the Fruit.—The fruit is nothing else but the ovary arrived at perfect maturity. It is composed of two principal parts—the pericarpe and the grain.

The pericarpe is that part of the fruit which contains the grains, and the cavity of the pericarpe may be simple or multiplied, and the fruit may be like the ovary, unilocular, bilocular, or multilocular, according to the number of cavities it contains. It is composed of three other parts: 1. The epicarpe or outer membrane, which covers the fruit externally; 2. The sarcocarpe, or pulpy part of the fruit, which is situated immediately under the epicarpe; 3. The endocarpe, or the membrane which lines the internal cavity of the fruit, and which is in direct contact with the grains. It is easy to understand this description by cutting an apple in equal halves.

There is also a communication between the seed and the pericarpe in some instances, which is termed trophosperme or placenta. We see this in the pod of a garden pea. The seed is covered by a membrane named episperme. There is also a small prolongation from the trophosperme to the grain, which is termed podosperme, which means the foot or root of the seed, and it establishes a means of communication between the ovules and the pericarpe. It is through this prolongation that the ovules have the nourishment necessary for their transformation into grains, like the umbilical cord in animals. The small cicatrix on the grain is called the umbilicus, as in man, and it results from the detachment of the podosperme or umbilical cord from the fruit. The examination of a pea affords a perfect view of all these parts.

Means for the Dissemination of Plants.—The means which nature employs to disseminate plants on the surface of the globe, and to prevent the extinction of the species, are worthy of attention. The chief of these means is dehiscence (parturition of a plant), which consists in the rupture of the pericarpe to allow the escape of the seeds. This operation, as in animals, does not take place until the germs have acquired all their maturity. Then the grains endeavour to escape, rupture the connections which retain them in the pericarpe, and escape on the surface of the earth, to produce new beings, for without this occurrence all vegetables would disappear from the surface of the globe. Nature employs a number of means for the propagation of plants in different parts of the earth, and to prevent the extinction of the species; as the mode of dehiscence of certain fruits, the promptitude of germination in a number of grains, the power which others possess of remaining incorruptible for a great length of time, the winds and the waters, which transmit them to a great distance, the animals which swallow them entire and afterwards expel them, and lastly, their great fecundity. A few illustrations may be given of each of these wise contrivances, as all of them afford peculiarities, which are extremely curious to those desirous of examining and observing the propagation of vegetables.

Dehiscence, or Dissemination.—There are some fruits whose pericarpe at the period of maturity, opens with such rapidity that the grains are projected with an elastic force to a very considerable distance, and sometimes with an audible noise. We observe this in the willow, the fraxinella, &c., and it is familiar to all horticulturists.

Promptitude of Germination.—There is a vast number of plants which germinate with astonishing rapidity, some even in the short period of three days.

Incorruptibility.—Most grains, except the oleaginous, remain incorruptible; some have remained forty, fifty, a hundred, and even a thousand years. Some have been found between the bandages of Egyptian mummies, which retained their power of germination. Mr. Pettigrew mentioned facts of this kind in his lectures on Egyptian antiquities, delivered at Exeter Hall, 1837.

Winds and Waters.—A vast number of grains are so light that they may be transported to great distances by the winds; others float in the air, and according to some botanists, have been transmitted from one country to another, and even from one continent to another. Thus it is said that the erigeron of Canada, was transported by the winds from North America to Europe. In the same manner it is stated that rivers, torrents, the waters of the ocean, transport seeds to a great distance, from one island to another, and from one continent to another. The cocoa of Maldiv islands is said to be conveyed by the ocean to the Schelles. The coasts of Norway present fruits which were transported by the same means from America.

Germination.—When the seeds of plants are placed on the earth—and they are shed where they grow, because the season of ripening is also the natural season for sowing—they become covered with the fallen leaves, or by the treading of cattle or other influences, as by the rain, wind, &c. It is necessary for perfect germination, that there should be a free air, a moderate degree of moisture, and a temperature suitable to the kind of seed. The heat of the soil at seed time, whether in spring or autumn, in this climate, is from 40 to 50 degs. of Fahren.; and this is sufficient for corn and all other plants suited to the soil of Great Britain and Ireland. It is an axiom, that the most perfect and sound seed produces the most vigorous plants.

A certain degree of humidity softens the pericarpe, husk, or shell; the chemical constituents of air and water are absorbed, and with the excitement of a necessary degree of heat, the whole swells, the rostells or seminal points protrude through the integuments, some descend into the earth and the others ascend into the air and form the infant stem. The size of the seeds will determine the depth at which they ought to be placed from the surface of the soil. It is also a fact that defects and hereditary diseases are almost always as transmissible in vegetables, as in animals. If the parent had any peculiar manner of growth, either good or bad, the seed will generally inherit it. Although this is a general rule, it is not without exceptions. It is also observed that a frequent change of seed is a necessary expedient in cultivation in order to insure the best returns. The seed not only requires a change from

one soil to another, but also from one country to another. The seed is the result of generation.

It is generally admitted, that intermarriages are also essential to the production of vigorous offspring and population ; while marriages between near relatives are generally injurious.

CHAPTER VI.

GENERATION OF THE ANIMAL KINGDOM.

In the preceding chapter I described the function of reproduction in the lowest section of organised beings, namely, in plants, and now ascend to the first class in zoology, which many eminent naturalists have arranged with the former, but which recent and more accurate researches have determined to belong to the animal kingdom. In ascending from the lowest to the highest class in the zoological scale, we shall clearly perceive the more perfect conservation of animals, and the varied species of their reproduction, all of which tend to elucidate the mysterious function of generation in the human species. This was the plan pursued by all naturalists and physiologists, by Hippocrates, Aristotle, Harvey, Spallanzani, Cuvier, Virey, Mason Good, and a host of others.

Generation of Animals.—What a vast, sublime, and at the same time delightful field, is the study of the generative functions in this class of living beings, at the head of which stands the human species? What curious and varied phenomena, all tending to the same result! What an incalculable profusion of different reproductive processes nature employs for the propagation of the numerous species which she calls into life! And, nevertheless, what unity and what analogy of propagative actions among all the individuals of the same class, from the bramble heath on which we tread, to that proud being who is so eminently qualified to be prince of animals, and king of the universe.

Though the study of the generation of animals presents to the mind of the observer a host of subjects capable of vividly exciting the curiosity, it still furnishes a host of gifts of the deepest interest, whether we consider the advantages of the beings under our empire, whether to serve our comprehension and explication of the numerous phenomena of human generation, on the mechanism of which nature would appear, at first view, to have thrown an impenetrable veil.

A complete history of the generation of animals, and especially of the infinity of modifications in this mysterious process of perpetuating each species, would be an immense undertaking, to the elucidation of which the entire life of one man would be insufficient, and which is perhaps beyond the comprehension of his natural faculties. What an infinite number of organizations and different species among the almost innumerable living beings which the earth receives on its surface, which fly in the air, and which swim in the unfathomable ocean! What an immense number of others whose organization, and consequently whose

mode of reproduction escape the eye, even assisted by the most powerful microscopes !

“How numerous are the springs,” says Buffon, “the powers, the machines, and movements included in that small portion of matter which composes the body of an animal ! What relations, harmony, and correspondence between the parts ! How many combinations, arrangements, causes, effects, and principles, which concur to the same effect, and which we only know by the results, so difficult to be understood, and they have not ceased to be marvellous, but on account of our not reflecting upon them. But, however admirable does this work appear to us, it is not in the individual that the great wonder exists ; it is in the succession, renovation, and duration of the species, that nature appears altogether inconceivable. The number of the species of animals is much greater than of plants. There is, perhaps, a greater number of insects, most of which escape our observation, than there is of plants visible on the surface of the earth !”

I have described, in my *Lectures on Midwifery and Diseases of Women and Children*, published 1836, the function of reproduction in all the classes in zoology, with a view of showing the analogy of all, and the consummate wisdom of the Creator in regenerating organized beings.

I there described the reproduction of zoophytes, insects, crustacea, worms, mollusca, fishes, reptiles, and birds, and gave the observations of the illustrious Harvey on the ovology of the gallinaceous egg, which led him to the investigation of embryology in many of the mammalia, and to his conclusions on human generation. He proved the identity of ovology in the gallinaceous egg, in the mammiferæ, and in the human species, and established the axiom both in the vegetable and animal kingdom—*omnia ex ovo*. It is a most remarkable fact that his descriptions of animal ovology are in strict accordance with those of the human being of the present period.—(See Velpeau’s and Breschet’s late works on Human Ovology, 1836, and the article Ovology in these pages.) Those who are desirous to peruse his experiments and observations, will find them in the lectures above referred to. The history of them would cause too great a digression in this work, which is chiefly confined to the reproduction of our race.

The animation of the first of the human species presents a question of physiology full of interest, on which men of the greatest genius have commented, though they have completely failed to solve it. The continuation and reproduction of our species have also occupied the reflections and investigations of the greatest philosophers and physiologists of ancient and modern times, some of whom have proposed hypotheses and theories replete with the grossest absurdities and errors. These hypotheses are about two hundred and fifty in number, and a brief notice of those which were best received, may not be uninteresting to the modern physiologist.

Plato thought that the reproduction of man, as well as of almost all organised beings, was effected by spectres and images extracted from the creative Divinity, which, by a harmonic movement, were arranged in certain numbers into perfect order. It was in the unity of the number three, that this great philosopher made the essence of all generation to

consist. That which engendered, or the father, formed the first number; the being in which the conception was effected, the second number; and that which resulted, the offspring, the third number.

The opinion of Plato was, that all generation emanated from the DIVINITY himself, who, by a perpetual course of miracles, maintains and renews the living world; and, consequently, that man is, in the phenomena of reproduction, but an instrument of the consummate wisdom of power which governs the universe; and secondly, that generation can only be effected by a male who furnishes certain principles to a female, in whose womb the result or new being, is developed; and that this law equally governs the whole of the animal and vegetable kingdoms. This tripartite harmony was also considered an image of that mysterious power, the TRINITY IN UNITY, which created and perpetuates all organized beings.

Pythagoras supposed that a vapour descended from the brain and nerves during sexual intercourse, and formed the embryo, which developed according to the laws of harmony. (Diogenes Laer. L. viii. ix.) Impressed with this idea, the Scythians took blood from the veins behind the ears, to produce impotence and sterility.

Epicurus held that the perpetuation of man was effected by a mixture of the fluids by both sexes, which were united in the sexual organs of the female, animated, developed, and changed into a being resembling those who furnished them.

Lucretius and a great number of ancient physiologists admitted this doctrine. He considered that there was a mixture of fluids, and that the most vigorous determined the sex, which is now the general opinion. His words are:—

Et commiscendo, cum semen forte virile
Foemina commulsit subita vi corripuitque,

* * * * *

Semper enim partus duplice de semine constat.

Atque utrique simile est magis id quodcunque creatur.

De Natura rerum, l. iv.

He also explained the resemblance of infants to their parents in the following manner:—he thought that whichever parent furnished the most elaborated and abundant seminal fluid would impress the lineaments and form on the offspring—that the most vigorous parent who would possess most genital power, would determine the sex and physical characters of the infant, and, consequently, that the offspring would most resemble this parent, both in mind and body. But if the father and mother possessed equal power, the infant would resemble both.

Hippocrates and a vast number of his successors, as well as all modern physiologists, admit this doctrine.

Hippocrates, Pythagoras, Democritus, Aristotle, Anaxagores, Alcmeon, Parmenides, Empedocles, Epicurus, Galen, Avicenna, Zacutus Lusitanus, Decartes, Venette, Rousel and Buffon, acknowledged the existence of a fecundating sperm in woman; while Zeno, the Stoics, Hippon, and Fallopius, with many other celebrated anatomists, denied it. It is important to observe, in passing, that the mucous fluid which

is generally, but not always, more or less effused by the uterus and vagina, during copulation, is not seminal or prolific, nor does it contribute to the formation of the new being. It is furnished by the lacunæ and glands of the vagina and neck of the womb, and by the lining or mucous membrane of these organs, and the Fallopian or uterine tubes (see *plate 4, fig. 1*). This fluid may be more or less abundant; and according to Magendie and others, is not effused by some individuals, and by others only very sparingly. Moreover, it does not occur during the greatest excitement, which is during and immediately after the male emission (*vide ante* p. 48).

Galen related the case of a hysterical woman, who on the slightest excitement of the genitals had a mucous evacuation, accompanied by voluptuousness, and this also happened during sleep. Sauvages mentions the case of a young girl of the most rigid chastity, who suffered from abundant vaginal discharges, even at the feet of a decrepid and disgusting confessor. (T. iii. p. 277.) Her disease was leucorrhœa or whites. Loyer-Villermay describes a similar occurrence at the access of hysteria. Such evacuations may also be induced by an excited imagination, by relaxation of the mucous membrane of the vagina, as in leucorrhœa or vaginal debility, and they may also occur in those who are sterile from diseases of the womb or ovaries; but they most certainly cannot be considered seminal or prolific, or necessary for generation.

The prolific fluid is supplied by a small vesicle or egg in the ovary, (see *plate 4, fig. 1.*), and is too trifling to be appreciated during coition, and scarcely even in the ovary on inspection after death. The ancient anatomists were therefore right, when they termed the ovaries, *testes muliebres*—the organs which secreted the seed in woman, as the testicles do in man. This conclusion strictly accords with Divine authority. “I will place an irreconcilable bar between the seed of the woman and the seed of the serpent.”

Hippocrates, who was unacquainted with human anatomy, supposed that the spermatic fluid of man was furnished by all parts of the body, and especially by the brain, as the principles of generation formed a new being, a miniature of the entire organization. As to the opinion that the spermatic fluid was formed by the brain, that it descended along the spine to the loins and sexual organs, it is decidedly erroneous, for there are no tubes to convey it, and when the testicles which secrete it are removed, there is no seminal secretion. It is a remarkable fact, that the organ of love is now placed in the cerebellum by the followers of Gall and Spurzheim, our modern phrenologists. For ample information on this doctrine see my work on *Prostitution in London and Venereal Abuses*, 1839. The father of physic also entertained the opinion of Lucretius, that the resemblance of infants to either parent depended on a greater or less quantity of seed furnished by either. He held that a male resulted from a mixture of both seeds equally hot and elaborated: whilst a female was produced when the father or mother supplied a weak fluid, or one which was suddenly secreted. He supposed that on the mixture of both seeds the new being was formed in the womb. That this mixture absorbed heat, and passed from a state of fluidity to a certain consistence. Acted on by continued heat and vital-

ity, the germ or new being, evolved a vapour which formed a round pellicle which enveloped it, and that it always received a new principle of life from the mother (see *plate 5, figs. 3, 4, 5, 6*).

The pellicle or fine membrane formed an entire covering of the body, which finally was the skin, gave out a vapour which was condensed, and formed another membrane, and this part condensed a vapour into a fluid by which the embryo was surrounded. In fine, he held that one point of this sac attached itself to the womb by a spongy, vascular union, through which nutrition was derived and carried to the navel of the foetus by means of the umbilical cord or navel-string.

It will appear hereafter, that this view of human ovology, though promulgated more than four centuries before the Christian æra, does not differ essentially, as regards the connexion between the embryo and mother, though otherwise in a great measure erroneous, from that of the latest writers on embryology (see explanation of plates 5, 6, 7, 8.)

Aristotle admitted the female ejaculation, but denied that it contributed to the new being, in which he was perfectly right; that the male alone furnished the principles, while the female supplied the necessary materials for their development, and these he considered, with Hippocrates, resided in the menstrual fluid. This was an error. The menstrual fluid I have already explained, (see p. 65) is a natural secretion, the result of a periodical determination of blood to the womb, which prepares it for conception, and when this happens, the foetus is nourished by blood, supplied by the mother through the placenta or after-birth. He said that woman furnished the marble, man was the sculptor, and the embryo the statue. (*De Generat. Animal.*)

Averrhoes, Avicenna, and many others, adopted this doctrine; but the greatest number of physicians maintained the system of Hippocrates.

Galen held that the embryo was produced by the seed of man, and that the materials afforded by woman nourished it. Diogenes, Hippon, and the Stoics, concluded that the embryo was produced by the male seed alone, and that the mother only served for its development, as the earth does for the germination of grain.

Decartes supposed that the mixture of the two seeds produced a fermentation, in which the embryo was formed; while Pascal and other chemists held that the spermatic fluid of man was acid, and that of woman alkaline. (*De Formatione Fœtus.*)

Viussens maintained that both seeds contained spirits; and Van Helmont held that the female furnished seminal fluid, and the male a spirit or vital principle.

Maupertuis was of opinion that each seed contained an imperfect animal, or parts of an animal, which it finally resembled.

Empedocles had previously supposed, with Aristotle, that the embryo existed in separate parts, in the seeds of both sexes, which on being united, formed a regular order and a perfect whole. (*Delamethria. Inst. Boerhaave.*)

Harvey concluded, after innumerable experiments on animals, that the germ was in the ovary in animals and plants; and he was the first who maintained the doctrine now universally admitted as correct—

Omnia ex ovo. He supposed impregnation was effected by a kind of magnetic influence. (Op. cit., 1651.) J. Fabricius had previously proposed the theory of the *aura seminalis*. (De Formatione Ovi, &c., 1625.)

De Graafe contended that all animals were produced from an egg, maintaining the opinion *omnia ex ovo*, that germs existed in the ovary in the form of small transparent vesicles or ovules. (De Mulier. Organis, &c. 1677.) This doctrine was also admitted by Steno, Van Horn, Swammerdam, Malpighi, Harvey, Valisnieri, Ploucquet, and many other celebrated physiologists, and is now generally received.

The next hypothesis was proposed by Hamme, and advocated by Hartsoecker, Leuwenhoeck, Boerhaave, Keil, Cheyne, Geoffroi, Cardinal de Polignac, Lieutaud, and a host of others, who maintained, that the germs existed in the seminal fluid of man, in the form of small living worms, which they called *animalcules*, that one drop of sperm contained millions of them, that projected into the cavity of the uterus during coition, one or more of them ascended into the uterine tube, arrived at the ovary, entered a vesicle, caused impregnation, and returned into the womb under the form of a small ovum or egg; and finally developed into an embryo. MM. Prevost and Dumas also maintain this doctrine in their recent work. They assert that in a vast number of artificial fecundations, they never effected vivification when the animalcules were killed or destroyed. This conclusion is incorrect, as will appear hereafter. Spallanzani stated that he mixed three grains of the spermatic fluid of a frog with seventeen ounces of water, immersed the point of a fine needle in this fluid, and having applied it to the spawn of the female, caused impregnation. According to Pritchard's Microscopic Researches, 1834, a drop of any fluid contains myriads of animalcules, of different forms, which corroborates the former opinion. M. Raspail contends that the animalcules are organic remains, or the product of the decomposition of the sperm. M. Virey regards them as bladders distended by a sort of pollen, which burst when they arrive in the organs of the other sex.

The objections against this doctrine are, the hybrid productions; as the mule, procreated by different animals; the procreations between the stallion and the ass, and the ass and the mare; and the folly of supposing that only one of many million animalcules would be vivified and the rest destroyed. This would be contrary to the wisdom of the Author of nature. Nevertheless, it has been lately proposed by an anti-population American, that a woman who wishes to prevent conception, should inject the vagina immediately after coition, to destroy the animalcules. This recommendation displays great ignorance, and still greater depravity; and would be as ineffectual as it is impracticable and absurd.

Vallisnieri supposed that man commenced his existence as a worm, which developed itself by degrees, as an insect metamorphoses itself. This hypothesis was also entertained by Bourguet, Woodward, Lyonnet Rai, Schelhammer, Paitoni, Launai, Duverney, Schlichting, Ploucquet, Hamberger, Senac, &c., and even Linnæus and Buffon seemed inclined to adopt it. But Spallanzani has shown the falsity of this hypothesis by fecundating the ova or eggs of a frog without these spermatic worms.

The succeeding hypothesis was designated *epigenesis*, or the partial and successive formation of the foetus, a system maintained by Aristotle and Galen, revived by Descartes, Harvey, Needham, Muller, &c. This was called essential power, *vis essentialis* by Wolf, *nisus formativus* by Blumenbach, and plastic form by Cudworth, and is analogous to the attraction of parts and superstructure of organs proposed by Maupertuis. (*Venus Physique*, 1745). Buffon almost revived this hypothesis. He held, that during the most vivid enjoyment a number of organic molecules was separated from every part of the bodies of both sexes, that they resembled the parts which supplied them, that when they arrived in the womb they approached each other and united; but that those supplied by the eye, the nose, the heart, &c. of man, could only unite with those supplied by the same organs in woman. But every one acquainted with anatomy knows, that there are no passages for such parts to the womb, and that this supposition is imaginary and unworthy of credence.

Bonnet, Spallanzani, and the Italian schools, maintained that the germs pre-existed and were created since the beginning of the world, and were successively transmitted through innumerable individuals. According to this doctrine, Eve, the mother of mankind, possessed all the germs of men born, and to be born on the face of the earth; and every species of animals and plants must possess the same power. Such is the system of evolution. MM. Virey and Velpeau very properly object to this theory, on the grounds of the infinite divisions of matter, as a grain of corn might reproduce until it covered the earth; and the latter concludes that the ovary secretes the germ (*Traite Elementaire de l'Art des Accouchemens*, &c., 1835), which is now the generally received opinion.

Sthal considered that the soul had the power of creating and organising the foetus; and Van Helmont admitted a formative spirit, a seminal being in the womb, of the same genus of spirits as his Archæus in the stomach; and both authors attributed marks and deformities to mental emotions. According to these authorities the sperm is a living fluid, which transmits the soul as well as the moral and physical qualities of the father to the foetus. This is mere assertion without any proof.

The ancients were generally of opinion that the ovaries in women were analogous to the testicles in man, and supplied a seminal fluid necessary for reproduction. This opinion prevailed until the time of Steno, a Danish anatomist, who first maintained that the vesicles in the ovary contained a liquid resembling that in the eggs of birds, were ova or eggs, or germs containing the design and lineaments of the embryo, which after having been fecundated by the seed of the male, swelled, burst, escaped into the uterine (Fallopian) tube, fell into the uterus, there to undergo all the development of which the new being was capable. This is now the received opinion, (see *plates* 5, 6, 7, 8.)

The experiments of Fabricus ab Aquapendente on the eggs of pullets, those of Harvey on similar eggs, on bitches, on sheep, confirmed this opinion, and left no doubt that viviparous animals were produced from an egg like oviparous. De Graafe, Malphigi, Haller, Bonnet, and Spallanzani, after an immense number of experiments, confirmed the

conclusion as to the pre-existence of germs in the ovaries. They concluded that the fecundation of the germ takes place in the ovary, the received opinion at present, and that the development of the product of fecundation, is a simple evolution, and not an epigenesis, as formerly supposed. Harvey was the first who maintained that an ovum, egg, or vesicle, dropped from the ovary after impregnation, and De Graafe subsequently proved this fact by precise experiments. Dumas and Prevost have lately confirmed it by recent investigations. Bussiere saw this egg or ovule partly in the interior of the uterine tube, whilst it still adhered to the ovary. This is the received opinion of all modern physiologists.

I have given an illustration of an embryo in the uterine tube in *plate 4, fig. 2*, which could not have existed were not impregnation effected in the ovary. Besides, what would be the use of the uterine tubes (see *plate 4, fig. 1*), for when these tubes are obstructed conception cannot happen.

Generation—Procreation of the Germs.—The mysterious function of reproduction is still involved in obscurity. The transmission of life by parents in the animal and vegetable kingdoms remains as incomprehensible as ever, and must be referred to the DIVINE CREATOR.

Fecundation is effected differently in different animated beings. We have already observed that the generation in animals, insects, fishes, reptiles, birds, and vegetables, occurs from the existence of a germ or ovum, and hence the truth of the ancient axiom, *omnia ex ovo*—all generation is from an egg.

A question has been discussed, but not as yet satisfactorily determined, what is the seat of generation in the human subject; is it in the womb, is it in the oviduct or uterine tube, or is it in the ovary?

Almost all the ancients believed that the germs of male and female came into contact in the womb, and formed the new being. Dr. Blundell, and many recent physiologists, suppose with some of their predecessors, that there is an electrical, or galvanic, or magnetic influence which effects generation.

“Has galvanism or electricity any share in the consideration of the Great Designer? Time, the discoverer of truth, may perhaps solve this important question!” (*The Principles and Practice of Obstetrics, &c*, by James Blundell, M.D., with notes and illustrations by Thomas Castle, M.D., 1834.) This was previously advanced in the French Encyclopædia, *Art. Generation*, and is now the doctrine of meteorologists as already stated.

The great majority of modern physiologists entertain the opinion that fecundation is effected in the ovary. Prevost and Dumas adopt the idea of Buffon, Maupertuis, Aristotle, and Hippocrates, that the cavity of the womb is the seat of fecundation. Dr. Blundell concludes that the rudiments (ovum) and fecundating fluid of the male meet in the uterus. This conclusion is contrary to the received opinion; and would not account for tubal, ovarian, and extra-uterine, or abdominal pregnancies. He admits “that the secretions of our sex reach to the ovaries, that there can be no full formation of the foetus without the mixture of the two substances (male and female.)” And it is clear that in ovarian pregnancy such deep penetration must occur. Perhaps the overaction of

the genitals and the conveyance of the semen too far, may be the exciting cause on which extra-uterine pregnancy depends." I cannot assent to the last notion, for were it true, extra-uterine pregnancy would be of frequent and not of very rare occurrence; and I agree with those who ascribe it to relaxation of the uterine tube after impregnation in the ovary. Moreover, conception has followed the slightest possible penetration of the male organ within the labia externa, even when the penis was not more than half an inch in length after amputation. But in support of this hypothesis, some allege that in all their experiments, they never found the animacules in the uterine tubes or ovaries, that they found them in the cavity of the womb, that ovules must be imbedded in mucus which is supplied by the tube while conveying the ovum to the uterus; that they never could artificially fecundate ovules taken directly from the ovary, though nothing was more easily done on those which had passed into the womb.

In refutation of this conclusion it is only necessary to state, that Ruysch asserted he found the spermatic fluid in the uterine tube of a young woman who was caught in the act of adultery by her husband, and stabbed to death; and Haller discovered the fluid in the uterine tubes of sheep after having been slaughtered. In both these cases, I believe it more correct to state, that the alleged semen was probably a mucous fluid supplied by the lining membrane of the uterus and uterine tubes, and some recently recorded cases of semen being found in the cavity of the womb, are liable to the same objection.

My opinion was requested by an old pupil, now in practice, on a case in 1835, which bears upon the question at issue. A young woman was seduced by her pretended lover, and induced by the usual false promise of marriage, to allow him the privilege of a husband. The exact hour of cohabitation could not be determined, but early next morning, between six and seven o'clock, she swallowed a poisonous dose of laudanum, an empty ounce phial was found, and she was discovered dead between eight and nine o'clock. A coroner's inquest was necessarily held. There was no appearance whatever of seminal fluid in the uterus or tubes, but the inferior surface of the womb, from its vagino-uterine orifice to the fundus (see *plate 3, fig. 2*, and *plate 4, fig. 1*) was very red, and there was also a red vascular spot on the left ovary. The uterine tube of this side was likewise congested. The inference I drew was, that conception had occurred. The late Mr. Miller showed me various preparations of the ovaries of cats, rabbits, &c., presenting similar appearances a few hours after he had allowed the congress of the male animals of the respective species, and after having killed the females.

M. Velpeau well observes, in commenting on the preceding statements, that it does not follow, because the ovum of a frog could not be impregnated unless enveloped in mucus, the same thing happens in women. It was not to be expected that the removal of an ovum with an instrument could be effected without such violence as would injure it and unfit it for impregnation. We must also bear in mind the existence of ovarian, tubal, and extra-uterine pregnancies, which clearly prove that fecundation occurs in the ovary and not in the uterus, (see

plate 4, *fig. 2.*) Mr. Stanley recorded a case of ovarian pregnancy (*Med. Trans.* vol. vi.) and Dr. Granville another, in which the foetus was four months old. (*Phil. Trans.* 1820.) M. Bussiere relates a case in which one half of the embryo was in the ovary and the other in the uterine tube. Others attest the development of the foetus in the ovary, tube, and abdomen, among whom are Verheyen, Cyprianus, Saint Maurice, Gaussail, Littre, Haller, &c. Moreover, every woman and every female of the mammiferæ are barren, if deprived of both ovaries, or when these are completely disorganised, or when the tubes are impervious, or ligatures applied to them before copulation.

The experiments of Nuck, Haighton, and Blundell, afford the most conclusive evidence in support of the opinion, that fecundation occurs in the ovary. Nuck applied a ligature round the tube between the womb and the ovary, immediately after copulation, he killed the animal a few days afterwards, and found the impregnated ovum arrested by the thread. Dr. Haighton tied and also divided the uterine tube in rabbits before copulation, and invariably observed that no fecundation occurred in the ovary on the side on which he operated (*Phil. Trans.* vol. lxxxvii.) Dr. Blundell's experiments are described in the *Medico Chirurgical Transactions*, in his work on *Generation*, and also in the edition of his *Obstetrics*, by Dr. Castle, already quoted.

He divided the uterus of a rabbit, so as to obliterate its cavity; and he also obliterated the upper part of the vagina. The animal recovered, and was subjected to the male, but no fecundation took place, though there was an attempt at it, for corpora lutea (false ones, in my opinion, see p. 58) were developed, and a quantity of water found in the uterus. His experiments were numerous; and led him to the conclusion that the germs of male and female rabbits, and perhaps of all other animals, must come in contact with the fluid of the male to effect impregnation. From these experiments he infers that corpora lutea may form in rabbits independently of the full excitement of the genitals—that the mere absorption of the semen from the vagina by means of the lymphatics is insufficient for the purposes of formation. In one vaginal experiment, the access of the semen to the ovaries being interrupted, impregnation was not accomplished, though the animal admitted the male as many as fifty times, mostly at intervals of two or three days or more—a quantity of water was found in the uterus, as in the other experiments. In this case the male fluid must have been frequently absorbed from the vagina. This requires proof; but suppose it was, it only shows that the uterine tubes being tied, impregnation could not follow, or occur in the cavity of the womb, as previously supposed by this celebrated author.

The observations of Professor Montgomery of Dublin, are directly opposed to the opinion, that real corpora lutea can exist without impregnation (*Cyclopædia of Practical Medicine*, *Art. Pregnancy*, *Treatise on Pregnancy*, 1837; also Dr. R. Lee, *Lancet*, July, 1839; with both of whom I entirely agree, see p. 58 of this work.)

The theories of generation now maintained, are three:—1. The transmission of the spermatic fluid of the male through the uterus, uterine tube, or oviduct to the ovary, in which a vesicle, ovum, or egg, is vivified and passes into the womb to be developed, until the expiration

of the ninth month, when it is born and becomes an independent being; 2. The transmission of a subtle vapour or effluvium from the male semen (*aura seminalis*) through the same parts to the ovary, the impregnated ovum passing into the uterus to be developed in the manner before stated; 3. The absorption of the seminal fluid of the male from the surface of the vagina, (see *plate 4, fig. 1*—*plate 3, fig. 2*.)

The transmission of the spermatic fluid through the uterus, uterine tube, or oviduct to the ovary, a vesicle, ovum, or egg, being vivified or fecundated, and passing into the womb to be developed until the expiration of the ninth month or fortieth week, when it is born, and becomes an independent being, is still the most generally received opinion.

It is universally admitted, that during the act of copulation, the external and internal genital organs of both sexes, which are all supplied by nerves from the same sources, are excited and stimulated, the vagina contracts tightly on the penis, the uterine orifice is in close contact with the orifice of the male urethra, the tube or oviduct becomes straightened and erected, and its loose or floating extremity (*corpus fimbriatum*, see *plate 4, fig. 1, k.*) seizes on the ovary, and allows the male fluid after its injection into the cavity of the womb, to advance through the tube to the ovary, by a species of vital attraction or suction. The moment the spermatic fluid arrives at the ovary, which is seized by the extremity of the uterine tube, it acts on and vivifies one or more ova or ovules, and forms the new being, or beings.

The fecundated ovum, egg, or ovule, is now the seat of a new vitality, it becomes swollen, reddish, and finally bursts its membrane, and detaches itself from the ovary. The fimbriated extremity of the uterine or Fallopian tube grasps the ovary, and favors the passage of the newly formed being, the ovule or embryo, into the uterus to be developed until the expiration of the ninth month, by a series of the most extraordinary changes, which will be described hereafter. If the extremity of the tube loses its hold of the ovary, which may sometimes happen according to some writers, from excessive voluptuousness, fear, surprise, &c.; the ovule on bursting its covering may fall into the abdomen, there develop itself as an extra-uterine pregnancy, and finally destroy the patient unless she is relieved by gastrotomy or the first part of the Cæsarian operation. It is, however, a fortunate circumstance that abdominal and tubal pregnancies are, upon the whole, of very rare occurrence. A very remarkable case of this kind was successfully treated in London, 1836.

Almost all modern physiologists are of opinion, that the uterus possesses a power of suction and imbibes the semen after its ejaculation or a vapour arising from it. Ruysch, Haller, Lewenhoeck, Hartsoeker, Hunter, and others supposed that they had discovered the spermatic fluid of the male in the uterus; a conclusion which is denied by a host of others; and cases are on record, in which the orifice of the womb was permanently fixed external to the genital aperture, through which fecundation happened. Dr. Ashwell and Mr. Kingdon mentioned cases of this kind at the Medical Society of London a few years since. I have also seen one case of this description.

The Fallopian tube is said to become erected during the orgasm of

coition, to embrace the ovary, which embracement was observed in different animals killed after copulation, by Haller, De Graafe, and Cruikshank; in women, who died soon after coition, by Littre; and in a virgin, who died of hysteria, by Vallisnieri. The peristaltic and anti-peristaltic motion of the tube, the conveyance of the semen to the ovary, and the re-conveyance of the impregnated ovum to the womb, have been proved by ocular demonstration, by Beclard, De Graafe, Prevost, and Dumas, and by the experiments of Nuck and Duverney, and others, who arrested the impregnated ovum in the tube, by a ligature applied three days after coition; again by the tubular and abdominal pregnancy, in which the tube has allowed the ovule to escape (Lallemand). It is probable that the increased dilatation of the tube, after fecundation, is intended for the retention of the ovum for a very short time. But how can we explain the fact, that but one tube only is concerned in conception? What was the object of nature, in forming two tubes, two ovaries, two testes, two seminal receptacles, if one organ in each sex be sufficient for the propagation of the species? Or are the double organs in each sex intended for the formation of the different sexes?

The same orgasm that affects the ovary and tube is said to render the womb vascular, and slightly congested after conception (Harvey, Ruysch, Hunter, and others). Its internal surface, thus excited, secretes the albuminous concretion, called decidua, by Hunter, and epichorion by Chaussier, which becomes a membrane. These effects are purely sympathetic, because they likewise exist in extra-uterine pregnancies; they are more perfect, however, when produced by the presence of the ovule in the womb.

The volume, form, and direction of the uterus are gradually changed after conception (see *plate 9, figs. 1, 2, 3; plate 10, figs. 1, 2, 3*); its parietes become enormously thickened; its weight, at the completion of the term of pregnancy, is two or three pounds, and compared with that of a woman who has been a mother (two ounces), and with that of a virgin (half an ounce), we find it increased by nearly twelve and twenty-four. Its fibres are muscular (Lobstein); but not invariably so, as attested by Dr. Malins, of Liverpool, a former pupil of mine, and myself, in a case we published (*London Medical and Surgical Journal*, January, 1831, vol. vi). But I have now a preparation in my possession, obtained subsequently to this date, which clearly shews the fibrous structure of the womb in the last month of pregnancy.

The opening through which the ovum or germ escapes, the germinal disc, (see *plate 5, fig. 7, c*) becomes cicatrized, and is called the corpus luteum; it is described by Fallopius, Malpighi, De Graafe, Røederer, &c., &c.; and its development is not caused by the effect of the male semen, but is a peculiar function of the ovary; it is an indispensable consequence of conception (see p. 58); though some assert that it has been found in women who had not conceived, (Røederer), and in virgins (Haighton, Vallisnieri, Santorini, Bertrandi, Sir E. Home, Brugnone, and Cruikshank): in mules, by Brugnone; and in animals whose Fallopian tubes were tied before coition, by Haighton. But Dr. Montgomery has lately proved, that the true corpus luteum is never found

unless after conception (see p. 58). The male semen is also said to be carried to the ovary by absorption, or by a peristaltic motion of the womb and tubes (Galen, Fallopius, Morgagni, Hunter, Magendie, Richerand, Blumenbach, and Ruysch.)

The transmission of a subtile vapour, effluvium from the male semen (*aura seminalis*) through the womb, one of its tubes, to the ovary which impregnates an ovum, egg, or vesicle, which passes through the tube into the womb and is there developed, is the generally received, though still a disputed theory.

The illustrious Harvey made a vast number of dissections of hinds, and other animals immediately after copulation, and never discovered the male fluid in the womb; hence the opinion was confirmed, that vapour arose from it—*aura seminalis*—which passed through the womb and tube to the ovary, one of whose ova or vesicles it impregnated; and that the vivified ovule was conveyed through the tube into the womb to be nourished.

In support of this theory it is urged that impregnation has happened though the hymen was perfect, and nearly closed up the orifice of the vagina, except at the upper part, when no penetration of the male, further than between the external labia, took place. There are many cases of this kind on record; and a most remarkable one was lately described by Dr. Evory Kennedy, of Dublin: I have also been consulted in similar examples. It is also most certain, that the penis does not, indeed cannot enter the orifice of the womb, which is not much larger, in the unimpregnated state, than that of the male urethra (see *plate 4, fig. 1*; also, *plates 3, 11, 12*). I have known several instances in which the application of the male fluid between the external labia caused impregnation; a fact also attested by Dr. Blundell in his lectures in the *Lancet*, 1828,—“I know three cases in which the male organ was not suffered to enter the vagina at all, and where, nevertheless, I suppose, from the mere deposition of the semen, upon the labia, impregnation took place. I have known women astonished to find themselves pregnant, being persuaded that impregnation was impossible, until, to their sorrow the unwelcome truth was unfolded. In a word, from several facts of this kind, too delicate for a fuller disclosure, I am satisfied that very small quantities of the semen introduced into the lower part of the vagina, where there is an aptitude to become pregnant, will give rise to the new structure.” (*Principles and Practice of Obstetrics, &c.*, 1834). I have also recorded remarkable cases of imperfect penetration and prolific connexions, when the penis was so destroyed by disease that it was no more than half an inch in length (see *Manual of Medical Jurisprudence, 2nd Edition*, 1836).

I have been confidently assured by a gentleman of veracity, that he impregnated a woman although he barely penetrated the labia: his paramour consulted me perfectly unconscious of what had happened, for she had been inebriated at the time, and she most positively denied, when I declared, that in my opinion, she was pregnant, that it was possible, as she had never known man. My opinion was, however, unaltered, and I advised her to consult other obstetricians as to her condition. Several eminent obstetricians told her she was not pregnant; she called

on me again and again, and every time the womb was more developed as pregnancy advanced (see *plates* 9, 10, 11), and at last she felt the motion of the fœtus. Her paramour at length made the above confession; she recollected the circumstance of their having been together, and of his having induced her to take too much wine; and at the end of the ninth month, she was delivered of a healthful infant. Her case attests a fact I have stated in my work on *Medical Jurisprudence*,—that a healthful woman may be impregnated unconsciously, during inebriation, narcotism, catalepsy, and profound sleep. I have also known cases in which the greater part of the penis was destroyed by disease, or amputated close to the pubis, and yet persons so mutilated continued to propagate. In such cases, there could be very imperfect penetration, but it is to be remembered, that the expulsive power of the ejaculatory muscles of the penis remains in its natural condition. These and similar cases prove that perfect or deep penetration is not necessary for procreation, and they also favour the third theory of absorption of the semen from the vagina.

These cases show that it is not necessary that the male semen should be injected into the womb. Dr. Blundell supposes that, when there is a deposition on the vulva, generation depends on the admixture of the male fluid with the secretions of the female: “for,” according to his authority, “dilution does not destroy the fecundating power. If a glass of a certain height were filled with water, should sugar be thrown into the bottom of it, this, on solution, might soon be perceived in the upper part of the fluid, especially if agitation occurred: so the fecundating secretion may, by admixture, have penetrated to the inmost recesses of the genitals, more especially if the secretion of the genital surface be copious.” He goes on to observe, that children are sometimes not procreated for want of sufficient penetrative power in the male organ, which I very much question for the reasons already stated. He alludes to the experiments of Spallanzani, who found that three grains of the semen of a frog dissolved in two pints of water, were sufficient to give it a fecundating power, even the small quantity taken upon the point of a fine needle; from which Dr. Blundell infers, “if the female genitals be apt for conception, the requisite quantity of the male material is small,” (p. 67.)

This I beg leave to deny. It reminds me of another conclusion of a most distinguished obstetrician—that a single drop of male fluid is sufficient for impregnation,—which I venture to maintain is not the fact. In my opinion, there must be more fluid to perpetuate the species.

In reviewing Dr. Blundell’s positions, I am bound, by the many facts I have adduced in this chapter, to observe that they are, in my opinion, liable to many unanswerable objections. The results of repeated consultations enable me to state, that a complete emission of the male fluid, however copious or sparing, at the interval of twenty-four hours, will rarely, if ever, cause impregnation: nor do I comprehend the possibility of the germ or ovarian fluid passing into the womb to mix with the spermatic fluid of the male; and, therefore, the requisite quantity of the male material for impregnation is not so small as he supposes.

Neither can I perceive any analogy between the mixture of sugar and water and the spermatic and ovarian fluids; nor do I believe that children are sometimes not procreated for want of sufficient penetrative power in the male organ. Indeed, I know many cases to the contrary.

The orifice of the uterus is generally within two inches or two inches and a half of the external genital aperture in most women, though it may be more distant, or elevated under certain circumstances, and the slightest penetration, in the opinion of all modern physiologists, Dr. Blundell included, when the semen is properly elaborated, is sufficient for impregnation.

Lastly, it is to be recollected that the conclusions of Spallanzani refer to frogs, and not to the human species; and therefore it does not follow that such extreme dilution, as in the former cases, can ever happen in the latter, though there is generally, but not always, some dilution of the male fluid. If this were the fact, the male material would be always prolific, which every adult knows is not the case, unless it has remained in the seminal receptacles for one or more days, as observed by Harvey and others. Many proofs of this conclusion have fallen under my own consideration; and must be familiar to most men.

It is also to be remembered, that the mucus of the seminal receptacles, the prostatic fluid, and urethral mucus, more or less dilute, in most cases, the male fluid, as well as the vaginal and uterine mucus, during the seminal emission; although this last dilution does not always happen, and varies considerably.

The singular case mentioned by Mr. Hunter, in which he advised his patient, who had fistula in perineo, to inject the semen into the vagina, which caused impregnation, appears to me liable to serious objection; and, after due consideration of modern opinions, I should be very much disposed to think, there was a more certain cause for the procreation.

On a careful review of all the theories of human generation hitherto advanced, we can only arrive at a conclusion admitted by all the most enlightened and most ignorant, that a union of the sexes is necessary, that both sexes should be in good, or tolerably good health, and that the function ought only to be performed when dictated by nature.

The mechanism of ovarian, ovario-tubal, tubal, interstitial and peritoneal or extra-uterine conceptions, under all the proposed theories of generation, is inadequate for its satisfactory explanation.

There is, however, a vast deal of injury done to health and public morals by the excesses and abuses of the reproductive functions, some of which I have slightly alluded to in my works on *Medical Jurisprudence*, and on the *Comparative State of Prostitution*, &c. The primitive fathers and physicians have duly noticed the evils to which I allude; and every experienced medical practitioner can attest their frequent occurrence. It is all very well for sentimentalists and the pharasaical to declaim against any notice of them; but nature, justice, morality, and the preservation of health, as well as the healthful perpetuation of the human race, demand it. Having now described the function of reproduction in our species, I have next to give an account of the development of the new being, and of the changes which occur in the womb for its protection and support.

It would occupy too much space in this work, were I to introduce the whole history of comparative and human ovology, or the developement of the impregnated ovum from the instant of conception to the period of delivery, and must therefore confine myself to the latter.

I shall content myself with describing the influence of the maternal imagination on the foetus in the womb; the hygiology of women during pregnancy, parturition, the puerperal state, and lactation or suckling; and conclude the physiology of generation with an account of the function of parturition, the assistance required during that process, and offer a few hints for the physical education or management of the new born infant.

Foetus in the Womb.—All obstetric writers agree that the circulation between the mother and the infant is interrupted by the placenta or after-birth, and also, that there is not a direct nervous connexion between them. Nerves have never been discovered in the placenta, or in its continuation, the navel cord which passes into the infantine abdomen (see *plate 7*). The mind of the mother, therefore, cannot have a direct influence upon the foetus, no more than the circulation of her blood, whatever the late Sir E. Home, might have urged to the contrary, which nobody now believes, who has kept pace with the advance of medical science. The pulse of the mother is about 70, that of the foetus in the womb 120—140. Mental and corporeal excitement may derange the functions of the brain, nervous system, heart, and digestive apparatus of the mother; but such derangements can have only an indirect effect upon the foetus in utero. It therefore follows that the imagination of the mother cannot mark or deform the offspring; for if it could, no infant would be perfect; because there never was, perhaps, a pregnant woman who was not more or less frightened, or who was free from longings during her condition; and yet how few deformed or disfigured infants are born. The imagination is excited in every case of pregnancy; there is a constant cause, but very rarely an effect. This is bad philosophy; for every obstetrician, engaged in practice, has repeatedly known pregnant women, who had ungratified longings, who had been frightened by dismal objects, or had met with dreadful accidents or misfortunes, and yet their infants were perfect. We see this fact illustrated every day in this metropolis. Nevertheless, the belief is general among the middle and lower classes, and even among some medical practitioners, that the frights, longings, and imaginations of the mother can mark or deform the offspring; but this opinion is contrary to nature, reason, common observation, and medical science. I have known some hundreds of instances in which women feared that their infants would be marked; but I never met with one case in which such anticipation was confirmed. The belief in this error is, however, of great antiquity.

Most of the monstrous facts occurred in the sixteenth and seventeenth centuries, which were remarkable for superstition, ignorance, and credulity. A most singular illustration of the credulity of that era is afforded by a writer named Goftr. (*Hegenitii Itinerarum, &c., 1630*). This traveller states that he saw a tablet in the church at Leusdown (*Lausdunum*), about five miles from the Hague, with an inscription to the

following effect:—that a certain illustrious countess, whose name and family he gives, in the fortieth year of her age, brought forth, at one birth, in the year 1276, THREE HUNDRED AND SIXTY-FIVE INFANTS! all of whom were baptised by Guido the suffragan, who called the males “John,” and the females “Elizabeth,” all of whom, with their mother, died on the same day, and were buried together in the above temple. This case was said to have happened in consequence of the imprecation of a poor woman who carried twins in her arms, which the countess declared were not the offspring of one man, and this so incensed the mother, that she prayed that her insulter might have, at one birth, the same number of children as there were days in the year. No rational individual can credit this story, though it is attested by a tablet in a church.

It is now the opinion of all well educated medical practitioners, that the frights and longings of women during pregnancy, cannot mark or deform the infant in the womb. Every pregnant woman has suffered from fears, frights, and longings of one kind or other; and how rarely do we see marks or deformities in families.

CHAPTER VII.

OVOLOGY—EMBRYOLOGY—HISTORY OF THE FUTURE HUMAN BEING—ITS DEVELOPEMENT—NUTRITION—CIRCULATION.

There is no subject in the whole range of the medical or physical sciences, which has ever possessed so deep an interest to the student of nature, as the procreation and developement of the human race. It obliges us to trace the history of mankind from the embryo state, within the mother's womb—a point, a speck, an atom in the vortex of infinity—a molecule which cannot be observed at first, except by a microscope of five hundred diameter or power,—an organic infinitesimal point in organic union.

It is true, we may examine man in all his highest relations,—as emperor, king, legislator, physiologist, &c.,—but when we trace him back to his origin—to the moment when life and soul were imparted to him; we can neither comprehend nor explain how these attributes begin or end. It is all mystery to us. We may commence our investigations as near the moment of conception as possible, but the medical faculty never have been able to account for the mode of transmitting human life, or the manner in which it ceases. It has been sneeringly asked by some unfortunate modern materialists, whether soul and life are transmitted at the time of conception; and the question has been put, more as a matter of licentious ridicule than philosophical or physiological inquiry; it has been already answered in the affirmative, in the chapter on Generation (see p. 101); and I replied, to it so far back as 1821, in my Theses, “*De Genere Humano, ejusque varietatibus*,” published at Edinburgh for the degree of M. D., in these words:—“*Hæc est opinio, de vi generandi, inter celeberrimos hodie recepta, nempe, causa problem generandi humanam, amores et coitum inter sexus esse, quo fluida*

ex corpore utroque expelluntur, dein inter se commista prolis futuræ principium formant. Cui rei haud sufficit humorum mistus mechanicus; ERGO VIS LONGE ALIÆ NATURÆ AC MATERIA BRUTA NECESSARIA VIDETUR, *qua homulus tam vita animali quam anima rationali instruatur.* p. 8. "That a fluid was afforded by each sex for the formation of the human embryo; but that something besides the mechanical commixture of these fluids was requisite for the purpose of procreation, and a POWER, far different from brute matter, was exerted, by which the future offspring became endowed with animal as well as rational existence." This opinion was also maintained by one of the most eminent physiologists and distinguished surgeons of modern times—Mr. Abernethy. When speaking of conception, he said, "Now I pause here, that you may think of the positive absurdity of supposing that the foetus can be formed by either parent. How *can* it be? What is the testicle; for that undoubtedly secretes the fecundating liquor? Is it not a congregation of vessels? Why, then, it must be formed by aggregation of parts, after the secreting process has taken place. And what is the ovary, but a vascular part? I say it is impossible, therefore, to suppose that a young animal can be secreted: it must be formed; and then the only question is, where is it formed, and how is it formed?"—Lectures in the Lancet, 1828—*Ryan's Manual of Midwifery*, 1831, p. 62, (*vide ante* p. 103). This opinion is strictly correct, but not in the popular sense, (see p. 48, and the continuation of this chapter on ovology). The female germ in the ovary is a fluid—a drop of fluid, which can only be seen by the aid of a powerful microscope immediately before or after conception, and which is not effused during the act of reproduction.

I shall now proceed to illustrate human ovology from the engravings of Maygrier, Lizars, Velpeau, Breschet, Granville, Miller, Coste, Mr. Wharton Jones, &c. &c., and those published by myself in the *London Medical and Surgical Journal*, 1836, from the twelfth day of embryonic existence to the commencement and completion of the developement of the placenta; and I shall next illustrate the circulation of the human foetus, (see *plate* 5, *fig.* 1, 2, 3, 4, 5, 6,—*plate* 6, *fig.* 1. I have also examined a number of preparations chiefly collected from the inferior classes of the animal kingdom, illustrative of the ovology of the hen's egg, of the mouse, rat, cat, rabbit, bitch, sheep, cow, mare, and lastly, of the human species; and all present the closest analogy, if not almost a perfect identity in the developement of comparative and human ovology.

The term *ovule*, or *ovulum*, is applied to the germ before its arrival in the uterus, that of *embryo* during the first three months of utero-gestation, or until its different parts are distinct from each other; it is called *foetus* during the remainder of its sojourn in the uterus, and *infant* after birth, and until the seventh year, when childhood commences. The application of the word child to the foetus in utero, is physiologically incorrect.

Much discrepancy of opinion still exists among physiologists, as to the period after conception, in which the ovule or embryo is visible.

Hippocrates said, the ovum was visible on the sixth day; Mauriceau, on the seventh day; Meckel, on the fifth; Pockels, Sir E. Home, and

Bauer, on the eighth; and Haller, from the fifteenth to the twenty-first.

Velpeau dissents from all these writers, and properly denies that the present state of science is such, as to enable us to fix on the exact moment of human conception, or to prove that the embryo will descend into the uterus of the same animals at the same period after different conceptions. The exact moment at which the human germ is impregnated, and at which it appears in the uterus after its vivification, is as yet involved in utter darkness; and the researches of two thousand four hundred years have not yet penetrated the mystery which surrounds it.

The transmission of life by parents is still as incomprehensible to physiologists, as its nature and cessation. Delicacy forbids a rigid inquiry on the former subject, and the opportunities of examining the ovaries immediately after conception are so rare, that there never was, nor perhaps will be, a physiologist who could have availed himself of sufficient investigation by actual dissections. Hence the almost insurmountable barrier to the investigation of human ovology from the instant of conception, and the necessity of referring to comparative anatomy for the elucidation of the subject.

The ancient physicians applied the term *γυνή*, semen, to the product of conception during the first six days. The nine following days they called it *κύημα*, foetus; then embryo during twelve days; and they employed the word *παιδίον* to designate the foetus to the forty-fifth day, and these four epochs were characterised in two verses:—

Sex in lacte dies, ter sunt in sanguine terni,
Bis seni carnem, ter seni membra figurant.

Hippocrates, De Nat. Pueri.

The limits to which I am circumscribed in this work, prevent me from quoting the various opinions of the celebrated successors of Hippocrates on ovology; and must therefore confine myself to the conclusions of the physiologists of the last and present century.

The latest and most comprehensive account of human ovology, is that of Dr. Samuel Patterson Evans, of New Market-on-Fergus, which appeared in the *Dublin Medical Press*, Sept. 14, 1839, and which is as follows:—

I shall describe the parts in the following order: First, The ovaries, and their component structures. Secondly, The Graafian vesicle, contained in the ovary. Thirdly, The ovulum of the vesicle. And, lastly, The germinal vesicle, contained within the ovulum, and the “macula germinativa,” or *germinal spot*, the most important of the contents of the *germinal vesicle*.

I. THE OVARIES.—The structure, function, and uses of these important organs were not accurately known before the year 1668, when De Graaf, in his work, “*De Mulierum Organis Generationi inservientibus*,” pointed them out, (see p. 52). Their substance is made up of blood-vessels, nerves, and cellular tissue, in which lie embedded a number of spheroidal vesicles or sacs, called, after their discoverer, “Graafian vesicles.” They differ in size, not only in various animals, but also in different parts of the same ovary. During, and after sexual inter-

course, the ovaries become unusually vascular. After impregnation, one of the Graafian vesicles bursts—generally that which at the time is most developed—more superficially placed—and whose enlargement is greatest—and its contents, viz., a fluid and an ovulum, are discharged from its interior. This ovulum is then carried, by means of the Fallopian tube, into the uterine cavity (see *plate 4, fig. 2*), there to undergo those subtle and mysterious changes which ultimately terminate in the growth and formation of an independent and immortal being! The cavity which is left in an ovarium, after the bursting and escape of the Graafian vesicle, is gradually filled up with lymph, and leaves a spot of a bright yellow colour, hence the name “corpus luteum” is applied to it (see *plate 5, fig. 7, d.*)

It was the opinion of Haller and Vallisnieri, that a ready-formed ovulum did not exist within the vesicle of De Graaf, but that it was formed by the substance discharged from the vesicle, and first in the Fallopian tube became enclosed by a proper membrane, and so assumed the form and structure of an ovulum. De Graaf, however, did not think that such was the case; and the question has been finally set at rest by the observations of Dr. Haighton and Mr. Cruikshank; and the original proposition of De Graaf has been confirmed by the interesting researches of the illustrious Von Bäer, as well as by the more recent observations of MM. Prevost and Dumas.

“On examining the ovaria attentively,” says V. Bäer, “before any of the vesicles had been opened, I could distinguish a whitish yellow spot in almost every vesicle, which was evidently floating loose in the fluid which formed the contents of the vesicle. Being induced,” continues this indefatigable observer, “by curiosity, more than by the hope that I had been able to detect the presence of an ovum with the naked eye, through the vesicle, I opened it, and raising the little corpuscle upon the edge of my knife, then placed it under a microscope.” Thus was the ovulum of the mammalia first discovered.

MM. Prevost and Dumas, alluding to this subject, thus express themselves:—“Very probably,” say they, “the vesicles of De Graaf contain in their interior, the minute ovulum of the cornua, (*i.e.* one of the uterine extremities of the Fallopian tubes,) which are there surrounded by a fluid intended to facilitate their descent into the uterus. Twice, on opening vesiculæ, very far advanced, have we found in their interior, a small spheroidal body, a millimeter in diameter.”

V. Bäer, Carus, and others, inculcated the opinion, that the ovulum seen within a Graafian vesicle of mammiferous animals, corresponded, in every respect, with the vesicle discovered in 1825, by Purkinji, in the eggs of birds, and named by him the germinal vesicle; or that it was the analogue of the cicatricula, or that white spot, so familiar to every one, seen lying upon the yolk of an egg when broken—that the internal or granular membrane of the vesicula was analogous to the vitelline membrane of the bird’s egg, and that the fluid which is placed between this membrane and the ovulum, was the analogue of the vitellus or yoke. Thus it was concluded, that the Graafian vesicle itself was the egg of the mammalia, and the ovum which it contains, the analogue of the cicatricula.

Such was the state of our knowledge to the year 1834; when the subject of ovology, which had lain for a time dormant, until revived by MM. Velpeau, Breschet, and others, received a new impulse by the announcement of MM. Delpech and Coste, that they had discovered the germinal vesicle in the ovulum of mammiferous animals; Purkinji having first demonstrated its existence in the bird's egg, in 1825. And thus was established the important doctrine of the perfect and complete analogy which subsists between the ovulum of mammiferous animals and the ovum of birds. These researches of M. Coste were thought so important, that the Institute of France awarded him their gold medal for that year; and they have since been amply confirmed by the patient, laborious, and accurate observations of Valentin, T. W. Jones, Purkinji, Bernhardt, Wagner, Prevost, and Dumas, &c. &c.

Having thus premised, we will now proceed to consider the Graafian vesicle more in detail.

II.—THE GRAAFIAN VESICLE.—It will facilitate the study of the Graafian vesicle, if we consider it as being formed, externally, by the peritoneum, which encloses the whole of the ovary. Under this membrane, we find a dense fibrous coat, which is the proper membrane of the ovary, and which may be considered as common to it, and to the vesicle. We then come to the immediate, and, what may be called, the proper contents of the Graafian vesicles. These are—

1. *The External Membrane.*—This is, in reality, the proper coat of the vesicle. It is a thin and very delicate tunic, adhering, by its external surface to the internal surface of the fibrous membrane of the ovary, from which it is with difficulty separated, even with the help of maceration, (vide ante, p. 52.)

2. *The Vascular Coat.*—This is considered by some anatomists as constituting a distinct and proper tunic of the vesicle; but Valentin describes it as a layer of minute granules lying on the internal surface of the former membrane, from which it is seen to differ by its greater opacity; it is also thicker and softer than this tunic.

3. *The Proper Granular Membrane.*—This would appear to be nothing more than the internal portion of the last-mentioned membrane, in which the granules are in a more diffuse state of aggregation. It lies in close contact with—

4. *The Fluid Contents of the Graafian Vesicle.*—This consists of a slightly yellowish white-coloured fluid. It bears a close resemblance to soda-albumen in all its properties; and there are found suspended in it a great number of minute globules. Next we come to—

5. *The Germ Disk.*—This, the “discus-proligerus” of Von Bäer, is composed of a great many closely aggregated granules. It is crescentic-shaped, and visible to the naked eye as a greyish-white spot within the Graafian vesicle of the dog, cat, and rabbit; but a magnifying power of about fifty diameters must be employed to make it visible in the human vesicula. Imbedded in the centre of this disk rests—

III. THE OVULUM.—This is by far the most important of the contents of the Graafian vesicle. It is a minute, and perfectly spheroidal body, varying in size from 1-20th to 1-32nd, and 1-54th of a line. It lies sunk in the germ disk, close under the proper membrane of the vesicle,

its anterior surface touching the internal surface of the latter, but without being in the least organically connected to it. Its circumference is free; nor is any point of it attached, or at all connected with, or suspended to, any part of the adjacent tissues. Of this any body may satisfy himself, by opening the Graafian vesicle of a dog which has been killed shortly after copulation. He will then be able, after rupturing the vesicle, to extract the ovulum on the point of a fine penknife, without any difficulty.

The ovulum does not, it is observed, keep pace with the growth of the Graafian vesicle: in small vesiculæ it is, relatively, very small; while in older ones, though absolutely larger, it is relatively less.

I shall, in the next place, proceed to consider the separate parts of which the ovulum is composed; premising, that whenever, throughout this chapter, I make mention of the *germ* of mammiferous animals, I shall call it by the name of *ovulum*; and, when alluding to the *egg* of birds, I shall adhere to the word *ovum*.

Ovulum—its Structure.—When, as I have pointed out above, an ovulum is detached from a “vesicula Graafiana,” it is found, when examined under a high magnifying power, to consist of the following distinct and separate parts:—

1st. *An external Envelope or Membrane.*—This tunic is, in reality, the analogue of the vitelline membrane of the ovum. In all classes of the animal kingdom, in which it has been yet studied, it is found to be a perfectly simple membrane—presenting no traces of lamina—having no granules—and no fibres of any kind have been hitherto demonstrated in its substance. It is transparent, with a slight tinge of yellow; and has an uniform thickness throughout. Bæer, who discovered the ovulum of mammals, as I have before pointed out, misunderstood, altogether, its perfect analogy to the ovum of birds. This important fact, in the science of ovology, was first demonstrated by MM. Carte and Delpech; to whom is due the distinguished merit of generalising the celebrated Harveyan aphorism of “*omne vivum ex ovo*,” which may now be regarded as the starting point or basis of all modern researches into this department of philosophical anatomy.

It was likewise taught by V. Bæer, and other naturalists, that this membrane is actually one and the same with that which is called chorion; but it now appears, from the observations of Rathke, that the chorion, so called, is added to the ovulum, so that body is passing through the Fallopian tube into the uterus, in the same manner as the albumen of the ovum is added to the yolk, as it is passing from the ovary of the hen through the oviduct: and further, it appears, that what we are now considering as the external membrane of the ovulum, becomes, at a more remote period, that organ which has got the name of umbilical vesicle. (see plate 5, figs. 4, 5, 6).

2nd. *The Granular Layer.*—This, supposed by some to be membranous, completely surrounds the contents of the ovulum, except at that spot which is occupied by the germinal vesicle, where it lies in contact with the outer membrane. In the periphery of the vesicle the granules are very few, or altogether wanting; but in no instance are they ever found at that point of contact where the germinal vesicle is applied to

the internal surface of the outer, or, more correctly, the vitelline membrane of the ovulum.

The granules which compose the granular layer of the ovulum are rarely met with of equal magnitude. Of this layer, which, by some observers, is thought to be membranous, Valentin says, that he could never succeed in successfully exhibiting portions of it. However, as those granules always lie close to the periphery, and are never found in the fluid contents; and their definite limitation at the circumference of the germinal vesicle, it seems warrantable to draw the conclusion, that the fluid of the ovulum holds them together.

The granular layer is one of the most important parts of which I have yet given an account. It is supposed to constitute, in part, the rudiments of the future germinal membrane, which becomes developed after the germinal vesicle has burst, and discharged its contents upon the fluid of the ovulum, the layer of granule, and, perhaps, upon the germinal spot.

Before I proceed to consider the next part of the ovulum, viz., the fluid or yolk, it may not be uninteresting to consider a little in detail, the nature and office of the germinal membrane. For the discovery of this important part, which enters immediately into the formation of the embryo, we stand indebted to Pander, the friend of Von Bäer, and fellow pupil of Döllinger of Würzburg. While investigating the development of the chick, in ova, he discovered that the germinal membrane had its origin from the granular layer of the ovulum; and that it separates into two disjointed layers, viz., into a mucous, or vegetative, and a serous, or animal layer; the latter being in contact with the vitelline membrane; the former lying immediately upon the yolk itself. From the vegetative layer, spring the mucous and vascular tissues; and from the animal, the muscular, the osseous, and nervous organs have their origin.

In most vertebrated animals, the embryo is, at first, observed to be nothing more than the exuberant growth of a part of this germinal membrane near its centre; that is, about the situation occupied by the germinal vesicle, before the bursting of the latter. This exuberant portion becomes more and more distinct, until its growing independence is manifested, in a tendency to withdraw itself from the remainder. During the course of this separation, the layers become tubes; and finally, as the process of development goes on, fundamental organs.

I shall now return to—

3rd. *The Fluid or Yolk.*—It lies in the centre of the ovulum, enclosed by the granular layer; it is a clear semi-fluid, and of a viscid nature. Although this fluid performs to the embryo of the ovulum the same office that the yolk does to the young bird, still it differs somewhat from the true yolk of the ovum: for, while the latter consists of granules, and oil globules, which are intimately mixed together,—in the mammalia and lower avertebrata, they are not mixed: but both oil globules and granules remain more or less separate and distinct.

M. Carte, contrary to the opinion of Valentin, Purkinji, and Traguer, maintains that the granular layer, and not the fluid of the ovulum, is perfectly analogous to the true yolk globules of the bird's egg.

Judging from the accurate researches of Valentin, I should feel disposed to differ from the probably erroneous views of M. Carte, and to hold, that the fluid or yolk of the ovulum is, in reality, the true analogue of the yolk of the bird's egg. Valentin declares, that he could never find the granules in the internal fluid of the mammiferous ovulum; besides, as has been previously remarked, their great density at the periphery would not allow them to unite with the yolk fluid. We next come to consider—

IV.—THE GERMINAL VESICLE.—As the ovulum is the most important of the contents of the Graafian vesicle, so, in like manner, is the germinal vesicle the most important and interesting part of the ovulum.

This vesicle was first discovered, in 1825, by Purkinji, in the cicatricula of the bird's egg, and was named, after him, the "Purkinjian vesicle."

After this, in 1824, it was demonstrated to exist in the ovulum of the class, mammalia, by MM. Delpech and Carte. Bernhardt and Valentin, have detected it in the ovulum of all this great class. In the ovulum of no animal is it so easily seen as in that of the cat. Valentin says, that he has twice discovered it in the ovulum of the human female. The only English observer who has confirmed the views of the continental anatomists, is Thomas Wharton Jones, who, in a paper read before the Royal Society of London, and published in their Transactions for the year 1836, has described the germinal vesicle as seen by him, both in the human ovulum, and in that of other animals; and more recently it has been noticed by Professors Trager, of Erlangen, and Ehrenberg, of Berlin, as existing in the ovulum of amphibia, fishes, and the infusoria.

This little vesicle is an exceedingly delicate transparent sac: it measures, in diameter, about 1-20th of a line, and contains a pellucid fluid: it lies close under the outer, primary, or vitelline membrane of the ovulum. There are no granules in the fluid of this vesicle, but the fluid of the vesicle is more viscid than the yolk or fluid of the ovulum in which it floats.

On the circumference of this little vesicle, is discovered, (first, by Wagner), an opaque spot called *macula germinativa*, or germinal spot—that structure which, after the supposed bursting of the germinal vesicle (see *plate 5, fig. 7, d*), passes immediately into the foundation of the future being. The bursting of the germinal vesicle has been denied by Carte, Delpech, and Rolando, who maintain that it is persistent, enlarges, and that upon it is the future embryo developed. But, according to the microscopic researches of Purkinji, Valentin, and Allen Thomson, the vesicle is not seen in the ovulum, after it leaves the *vesicula Graafiana*, nor in the ovum after it has entered the oviduct of the hen. That this is the true state of matters is further attested by the observations of Rathke, upon the impregnated ovulum of the avertebrata; for, we find him affirming, that in the ovulum of the class, crustacea, he has many times seen the germinal vesicle burst, and discharge its contents upon the granular layer surrounding it. From our own observations, however, it would appear, that these seemingly conflicting opinions are easily reconcilable, when we reflect, that what appeared to MM. Carte and Rolando, as the persistent germinal vesicle

was, in reality, the very same body which has since been discovered by Professor Wagner, and named by him the germinal spot. This spot, which we noticed shortly above, has sometimes the character of a vesicle; which, although escaping the attention of Purkinji, and Valentin, might, nevertheless, with apparent certainty, have suggested to M. Carte, that the embryo was, in reality, developed upon a vesicula, (the "macula,") though, at the same time, the germinal ova had, in truth, burst.

V.—THE GERMINAL SPOT.—Wagner, following up the experiments and researches of Purkinji, Valentin, and Bernhardt, upon the germinal vesicle, discovered a part which lies within the vesicle, as it (the vesicula) does within the ovulum. To this minute spot, undiscovered before his time, he has given the name of "macula germinativa," or germinal spot, because out of it the germinal membrane has been seen to distinctly spring. This spot is, at present, thought to be less universal in the ovulum of the animal kingdom, than the germinal vesicle, which has been found in all germs hitherto examined. It has, however, been found by Wagner in the germinal vesicles of all the mammals, in some fishes, reptiles, and birds, and in some of the higher avertebrata: and Ehrenberg has lately detected its existence in the ovulum of the infusoria, (see Harvey on Generation, 1603.)

The "macula germinativa," or germ spot, is a small, glimmering, opaque body, about the 1-250th of a line in diameter. It consists of extremely minute spheroidal granules. This spot, when magnified with a power equal to about 800 diameters, is found not to consist of other than homogenous parts.

It is attached to the internal surface of the germinal vesicle, in the viscid albuminous fluid of which it is immersed.

Thus we find, that the ovulum, discovered by Von Bäer, is, in reality, a most complex and complicated organism, and by no means the simple vesicle it was supposed by him. Thus, we first find a Graafian vesicle enclosed within an ovary—then, an ovulum within a Graafian vesicle; or, as Von Bäer has somewhat metaphysically expressed it, "an ovum raised to the second power;" enclosed within this, again, we find the germinal vesicle; and lastly, within the germinal vesicle, we find the "macula," or germinal spot! "Is this, again," asks Wagner, "to have its contents?"

That the macula germinativa is the primitive part of the ovulum, and that the germinal vesicle, yolk, and vitelline membrane are added, subsequently, appears to me to be a reasonable proposition. Now, let us observe, that from what we know with regard to the eggs of insects, as well as from the relatively greater size of the germinal vesicle, compared with that of the yolk, as well as from the fact, that at certain periods, and under favourable circumstances, the ovulum is evidently enlarged by the addition of new parts. This view of the matter seems to be the true and ~~correct~~ one.

From reasoning analogically upon this subject, and bringing to our aid the assistance of comparative anatomy, I should feel inclined to adopt the opinion, that the germinal spot is the original and fundamental organism; and that the other parts are, in truth, added to it according as

the process of developement goes forward. Let us study, for a moment, what takes place when the ovum of the hen is detached from the ovary, and is passing along the oviduct.

First, it receives its albuminous coat; then the membrana Dutrochetii; next, the membrane of the shell; and, finally, the shell itself. Thus we are made acquainted with the important and highly-interesting fact, that to different portions of the oviduct is allotted the task of depositing those different parts as the egg is passing from the ovary to the cloaca. We also learn an analogous fact from Rathke, who, having devoted a great deal of his time and attention to the developement of the ovulum of crustaceous animals, both before and subsequently to their escape from the oviduct, observed that the vesicula germinativa is first formed and seen; by and by the vitellus is added, and soon after, in a different part of the tube, through which the ovulum is passing, the vitelline membrane is deposited around the yolk. As soon as this ovulum has escaped from the oviduct, the germinal vesicle has disappeared, and the "macula" becomes visible; then the vitelline membrane is enveloped in a coat of albumen, and over this the chorion is secreted; and, lastly, another membrane, which attaches the ovulum to the womb of the mother, there to remain until the young embryo is developed.

From the foregoing facts the following conclusions are strictly deducible.—

1. That the vesicle first noticed by De Graaf, as existing within the ovaries of mammiferous animals, is not the simple body it was supposed by him and other observers, but is, in reality, a most complex organ.

2. That it is not a Graafian vesicle which enters the Fallopian tube; but an ovulum which is discharged from it after impregnation.

3. That the Harveyan dictum:—"omne vivum ex ovo," is literally and philosophically true.

4. That the ovulum found in the vertebrata, mollusca, articulata, and zoophyta, is the perfect analogue of the ovum of birds. (Vide Harvey, *passim*.)

5. That to class animals into viviparous, oviparous and ovo-viviparous, is, in the present state of our knowledge, abstractly incorrect, and most unphilosophical. All organic life, vegetable, as well as animal, having, strictly speaking, its origin from an ovum or egg!

6. That the outer membrane of the human ovulum in the ovary is not that which is known as the chorion, but is, in reality, the perfect analogue of the vitelline membrane; the proper chorion being afterwards added in the Fallopian tube.

7. That the fluid or yolk of the ovulum is that, which in a bird's egg is called yolk.

8. That the ovulum of all animals is a most complicated structure, containing within it the germinal vesicle, and this, again, the germinal spot.

9. That the germinal vesicle is not persistent—it disappearing from the ovulum as soon as that body has been discharged from the Graafian vesicle.

10. That the germinal vesicle, when it bursts, discharges its contents

upon the “macula” or germ spot, and that this spot is the point from which the germinal membrane springs; and from it the embryo is developed.

11. That the “macula germinativa” is the primary part of the ovulum; and that the germinal vesicle, yolk, vitelline membrane, and chorion, are subsequently added;—and lastly, that the oviduct of the female bird is the analogue of the Fallopian tube of mammiferous animals. (see *plate 5, figs 1, 2, 3, 4, 5, 6, 7, 8.*)

In the above I have merely treated of the ovulum as it exists within the Graafian vesicle and Fallopian tube.

Bibliography.—Those who may wish to study this branch of anatomical science, will do well to consult the following:—The Various Systems of Physiology. Haighton and Cruikshank, Philos. Trans., 1797. Wolff’s *Theoria Generationis*. Prevost and Dumas, in *Annales des Sciences Naturelles*. Harvey’s 63rd Exercitation, &c. Redi On the Generation of Insects. Von Bär’s *Epistola de ovi Mammalium et Hominis Genesi*. Purkinji’s *Symbolæ ad ovi ovium historiam auto incubationem*. Wagner, in the *Edinburgh Philosophical Journal*, 1836. Bernhardt’s *Symbolæ ad ovi Mammalium historiam auto pregnationem*. Müller’s *Archives* for 1836. Allen Thomson, in *Edinburgh Philos. Journal* for 1830, *Edinburgh Med. and Surg. Journal*, 1839, and *Cyclopædia of Anatomy and Physiology*, part xiii. Valentin’s *Entwickelemgsgeschichte*. Rathke, in *Meckel’s Archives*, and in *Burdach’s Physiological Enfahrungsnissenschaft*. T. W. Jones, in *Philos. Trans.* MM. Carte and Delpech, in *Annal. de Scien. Nat.* Wagner, in *Ed. Med. and Surg. Journ.* for 1836. Carus, in *Burdach’s Physiology*. Barry, in *Ed. Philos. Journ.*, 1837. Thus far are the conclusions of Dr. S. P. Evans. Velpeau on Ovology. Breschet on Ovology. Granville on Abortion. Miller on Ovology. Dr. Ryan’s *Medical and Surgical Journal*, the *Lancet*, and *Medical Gazette*, 1837.

Development of the Embryo.—The impregnated ovum contains the elements of the new being, is detached from the ovary, and has been perceived in the Fallopian tube of rabbits three days after conception, by Cruickshank and De Graafe; Coste in twenty-four hours; and about the sixth or eighth day in bitches, by Prevost and Dumas; and Sir E. Home asserted that he found the human ovum in the womb, eight days after conception. (*Med. Chir. Trans.* vol. 2.) Cruickshank was of opinion, that it remained detached for two days after its descent into the womb, and then became attached to the organ by vascular filaments. It cannot be discovered in the ovary, uterine tube, or uterus, at so early a period in animals; a fact of which I was assured by the late Mr. Miller (see *plate 5, fig. 1, 2*).

The period of the descent of the impregnated ovum from the ovary, into the uterine tube is not as yet known. The late Mr. Hunter could not detect the ovum either in the uterus or tube, although it was supposed that nearly a month had elapsed since the time of conception. Professor Burns has examined three uteri within the first month of menstruation, and did not discover either ovum or foetus, but he could not determine the exact date of impregnation. M. Velpeau describes an abortion at the twelfth day, in which there was a distinct embryo,

with its vesicles and membranes (see *plate 5*, of this work.) Burns has seen the decidua formed on the eighth day after conception. (*Midwifery*, 9th Edition, 1837.) The mode in which the ovum becomes attached to the uterus, immediately after its descent into that organ, has not been as yet determined. Previous to its descent, it is supposed to nourish itself, while others conjecture that it receives nourishment from the tube, and also from the decidua.

My colleague, Dr. Rawlins, has informed me of the results of his investigations on ovology, and mentioned the following particulars:—

The ovulum in the cat enters the uterine tube on the seventh day after impregnation, gets half way down the tube on the ninth, and on the eleventh day it enters the uterus and rests upon its superior border.

From the moment the ovulum enters the distal extremity of the tube, and during its passage into the womb, there is a limpid fluid of a slightly yellow colour behind it, which becomes more viscid and very much diminished in quantity according as the ovulum approaches the uterus. When the ovulum enters the womb it is still moistened all round by this viscid fluid, which is supposed by Dr. Rawlins to be the source of nourishment to the ovule until it becomes attached to the decidua. On the eleventh day the internal surface of the uterus is congested and covered with an albuminous secretion which forms the decidua, portions of which may be separated by maceration.

When the ovulum first enters the uterus it rests inferiorly on the decidua, and is in direct contact with the uterus superiorly. It now becomes attached to a point at the inferior part of the uterus, and covered inferiorly and internally by the decidua, and as the ovulum enlarges it becomes completely enveloped by the decidua, except at the point of union between the ovulum and uterus, into which the umbilical cord enters. The point of union at first becomes covered with lymph, which gradually increases, and finally becomes organised, forming the placenta. The whole of this process is completed between the twenty-fourth and twenty-sixth day.

The decidua reflexa gradually comes in contact with the outer layer in the uterus, and both unite by a very delicate tissue; there is no fluid between the two, and in the latter stage of pregnancy they become agglutinated.

M. Coste found the ovulum of a rabbit in the uterus twenty-four hours after impregnation. Mr. Jones detected it in the tube on the sixth day, and Dr. Haighton on the fifth.

Meckel asserts, that the human embryo can be observed on the fifth day after conception; and that the ovum measures from six to eight lines in diameter. The embryo at that time appears vermiform, with a small head; the trunk separated from the head, and attached at a certain point to the decidua, or epichorion, without members, or without apertures, of a homogeneous appearance; three lines long, and weighing three grains (see also, *plate 5*, *figs. 5, 6*.) Sir E. Home describes it at the eighth day, as a vesicular, glutinous, pellucid, oval body, attached to the bottom of the womb; that it is composed of two oval bodies, joined as if by a neck; the one the head, the other the trunk. (Phil.

Trans. 1817; Med. Chir. Trans., vol. 2.) This description is not correct: Sir E. was deceived.

In another work (*de Genere Humano ejusque varietatibus*) I have given a description of the impregnated ovum, and said, that about the fourth week it resembles a tadpole, and probably, that its tail is the spinal marrow. A small point is perceived below the head, which pulsates, and this is the heart; and below this the abdomen appears. Thus the brain, medulla spinalis, and heart, are formed before the other parts. The ovum resembles a cone, somewhat curved (see *plate 5, fig. 6*;) the head and trunk equal; no distinct neck; face small; the spinal column perfect, and turned forward at the coccyx; the umbilical cord is short, and contains the intestines, the extremities appearing; it (ovule) is six lines long, and weighs eighteen grains. About the sixth week, two small black spots proclaim the developement of the eyes; the mouth appears shortly after; and the inferior and superior limbs bud forth, and soon become discernible. The intestinal tube is perpendicular, running along the spine; the anterior wall of the abdomen forms a projection, which still adheres to the membrane of the ovum. The ovum presents an ovoid form, and it is one inch and a half long, and one inch and a quarter broad. The embryo soon separates from the membranes of the ovum; other parietes of the abdomen assume a funnel-like extension, to form the umbilical cord or navel string; and the anus and genital organs appear. At two months, the eyes and eyebrows are visible; the limbs are developed; the fingers are closed on each other; the head forms the third part of the body. Between the ninth and tenth weeks the mouth closes, by the lips drawing together, but the cavity still communicates with the nose; the eyelids close the eyes; the auricular openings begin to appear; the spinal tail shortens; and the fingers assume their positions.

I have an embryo in my possession, about this age, which is quite perfect, and the organs of generation very evident. The parent assured me positively, that it was not more than two months and a half old. Duges asserts that the sexes are not to be discerned sooner than the fourth month.—(Manuel Obstetrique.) Towards the third month the face is distinct; the mouth open; the brain caseiform; the meconium in the stomach, the anterior part of the chest is covered by the sternum; the intestines, hitherto contained in the umbilical cord, enter the abdomen; the skin begins to be organised; and the embryo is from four to six inches in length. At the fourth month, the upper and lower extremities are equal; the skin is downy; the muscles contractile; the meconium in the small intestines; the auricles of the heart are larger than the ventricles; the foetus measures four inches long, and weighs about two ounces. About the fifth month, the auricles and ventricles of the heart are equal; the nails are consistent; the skin is still red; there are points of ossification in the sternum; the bowels capable of contraction; the length of the foetus ten inches; the weight sixteen ounces; the testes are still in the abdomen; the eyelids are coherent, and the pupil closed by the *membrana pupillaris*. At the sixth month, the hair appears; the brain is homogenous; the meconium brown,

greenish in the cœcum; and the testicles are under the kidneys; the length is twelve inches; weight, nearly two pounds. At the seventh month, the skin is of a rosy colour; the cellular substance becomes developed; the eyelids are covered; the membrana pupillaris is broken; the testicles descend to the abdominal rings; the valvulæ conniventes are observable in the small intestines; the meconium descends into the colon; the bile is bitter; the length of the body is fourteen inches; the weight about three pounds. At the eighth month all the parts become more developed; the testicles descend into the inguinal canals; the infant measures sixteen inches, and weighs between four and five pounds. At the ninth month, the foetus has acquired the perfect form of the human species; the two substances of the brain are quite distinct; the auricles of the heart are smaller than the ventricles; the meconium is in the rectum; the bladder full of urine; the skin is covered with an oily caseiform matter; the breasts contain a serous whitish fluid; the thymus and thyroid glands are red; the length of the body is generally twenty inches; and the weight seven or eight pounds. There is a considerable variety in the weight and dimensions of different infants, during the different periods of development; the body of the foetus is covered, while in the womb, with a whitish sebaceous substance, designated *vernix caseosa*, which requires to be washed off after birth. The use of this substance is to protect the skin against the effects of long immersion in the liquor amnii.

The average weight of the foetus at the full period, is about seven pounds; though it may be eight, ten, twelve, or even more: the average conjoint weight of twins, is about eleven pounds, (see *plates 20, 21*). The foetus is somewhat compressed in the womb, (see *plate 12*); its chin is depressed on the breast; its legs placed on the thighs or abdomen; the arms crossed upon the chest, or placed with the hands on the sides of the face or head. How wonderful the development of the infant! its body, consisting of a viscid gelatinous fluid, immediately after conception, and ultimately becoming the most perfect and complicated machine in the universe.

The womb becomes excited and more vascular from the moment of conception; it is softer and more spongy; an albuminous fluid is thrown out on its internal surface, which is semi-organized in the shape of a false membrane, which from being afterwards cast off, was called *membrana decidua* by Dr. Hunter, *epichorion* by Chaussier, and *caduca* by many moderns. This membrane lines the womb, and closes its inferior orifice; and also those of the Fallopian tubes, before the descent from the ovary of the vivified ovum, which in passing through the Fallopian tube, must push the decidual membrane before it, and thus make it fall back upon itself; the ovum not being in its cavity, no more than the lungs are in those of the pleura, or the abdominal viscera in the cavity of the peritoneum, as Moreau, Velpeau, and Breschet have well demonstrated: it is found lining the womb, in extra-uterine pregnancy. This reflected membrane does not belong to the ovum, only supports it, and is called the *decidua reflexa* in the early months of gestation. The ovum is covered by two membranes of its own, after its

escape from the ovary; the external one named *chorion*, which is thin, transparent, and provided with numerous vascular villousities, (see *plate 5, fig. 3, a a a*) which connect it with the decidua reflexa, except at that part in which the latter is reflected by the ovum, at which point the villousities finally form the placenta, or after-birth.

The physiology of the decidua vera et reflexa, is as yet undetermined. In the earliest months of pregnancy, both are separate, but they finally coalesce. The placenta intervenes between them at the period of parturition; and at all other parts of the uterine cavity, there is but one membrane. The portion between the womb and the placenta is the remains of the decidua vera, and that passing from the circumference of the placenta and over its foetal surface, and between it and the chorion, is the decidua reflexa.

The use of the decidua is to form a point connexion between the womb and the ovum; the vessels of the chorion shoot into it, (see *plate 6, fig. 1*), and finally become the placenta. The decidua is a temporary membrane, and is thrown off with the placenta after parturition.

The internal surface of the chorion is vascular and villous, and is separated from the internal covering of the embryo named *amnios*, by a quantity of serous fluid or allantois. The chorion is said to consist of two laminae or layers, by Burns and others: but Velpeau maintains that it is a single sheet, and distinct so early as twelve days after conception. The external surface of the chorion consists of a layer of flocculent vessels, which extend to and coalesce with, a certain point of the decidua reflexa, (see *plate 5., fig. 5.*) About the third month of pregnancy, and sometimes later, the external surface of the chorion loses its flocculent or shaggy appearance, and the point of union with the decidua reflexa becomes the placenta, or source of nourishment between the mother and offspring, (see *plates 5, 6, 7.*) At a more advanced period of pregnancy the chorion becomes thin and transparent, covers the placenta on its internal or foetal surface, and is also reflected over the navel cord or funis, (see *plate 6, fig. 2.*) The function or use of the chorion is to enclose and strengthen the amnions, and other parts of the embryo, and to form a point of union between these and the womb (placenta) by means of the decidua reflexa, (see *plate 6, fig. 1; plate 7, fig. 1. b. b.*)

The *amnios* is a thin, white, transparent membrane, separated from the chorion during the first two months of pregnancy, by a fluid called liquor amnii, or "the waters of the amnios;" others say by the allantois, (see *plate 5, figs. 4, 5, 6,*) but it afterwards coheres to that membrane, it lines the foetal surface of the placenta, ascends along the cord, and is lost on the cuticle of the infant, according to Velpeau, and most other modern authors, and is immediately lost in the skin at the navel. It is reflected over the chorion on the placenta and navel cord, (see *plate 6, fig. 1, d.; plate 5, fig. 5, b. b.*) Its function or use is to form the internal covering of the embryo, and to secrete a fluid termed liquor amnii, of which more hereafter.

This membrane has been injected from the mother, by Monro, and Weisberg, and from the foetus, by Chaussier. It is sometimes inflamed

(Mercier, Beclard, and Lee; *Lond. Med. Gazette*, vol. vii. 1830). See the author's lectures on "Diseases of Children,"—*Ovonosology*, *Lond. Med. and Surg. Journal*, 1833.

Some assert that the water of the amnios proceeds from the foetal excretions, others from the mother. It has been analyzed by the celebrated Vauquelin, who found it contain water, albumen, soda, hydrochlorate of soda and lime, and phosphate of lime. Berzelius found it contain fluoric acid; Scheele, oxygen; and a respirable gas, according to Lassaigne and Geoffrey-Saint-Hilaire, but this is refuted by Chevreul. This fluid is of a light straw colour, and possesses a peculiar odour. It varies in quantity, at the period of parturition, from one ounce, (two table-spoonsful) to a pint or more. The use of this fluid is supposed to be, according to some, a medium of nourishment to the foetus; others say to allow a necessary degree of motion to the new being, and more to protect it from the bad effects of external injury. Some women have scarcely any liquor amnii, or "waters," while others have an abundance, or as midwives express it, "it is a dry or a wet labour."

The *vesicula umbilicalis* (see plate 5, fig. 5, e), is a small sac situated between the chorion and the amnios at the origin or root of the umbilical cord, runs towards the embryo, into whose abdomen its duct enters, and it also forms a passage for the intestinal canal. It is analogous to the vitelline canal in oviparous animals, and runs from the yolk to the small intestines, (Meckel, Oken, Bojanus), and exists in the human embryo, (Wolff, W. Hunter, Oken, Bojanus, Meckel, Velpeau, Pockels, Duges, Tiedemann, &c. &c.) The arteries and veins on its external surface, are named ompholo-mesenteric, (see plate 6, fig 3, e, f.) The artery is connected with the superior mesenteric; the vein enters the vena portæ under the liver. These vessels have also been observed in the foetus near birth by Duges, and in the adult by Spangenburg.

The use of the *vesicula umbilicalis* is to nourish the embryo by the albuminous yellow fluid it contains.

The *vesicula allantoides* is a substance reflected from the chorion and amnios, (see plate 5, fig. 3, b b), and communicates with the bladder in animals. Its existence in the human embryo is denied by many, but attested by Hales, Dutrochet, Breschet, Pockels, Duges, and Velpeau. Duges asserts that it contains the fluid which is expelled in a large quantity some weeks or months before delivery. This is the disease called hydrorrhæa by the German writers. (*Lond. Med. and Surg. Jour.* 1830, vol. v. Monthly Series. Edited by the author.)

The *placenta, after-birth, hepar uterinum*, is a spongy, vascular mass, destined for the sanguification of the foetus, (see plates 6, 7, 8.) It is common to all mammiferous animals, and presents different forms. It is produced by the villousities of the external surface of the chorion, which become united with the epichorion or decidua. During the first two months, the villousities only exist; but, about two months and a half, they are much developed, and cover more than three-fourths of the ovum, at the middle period of gestation two-thirds only, and at the full period, a third or a fourth. Velpeau questions the accuracy of these conclusions, and is of opinion, that the placenta exists very soon after the ovule descends into the uterus, (see plates 6, 7, 19, 20.)

The placenta in the human subject, at the end of pregnancy, is a vascular spongy body, flattened, circular, oval, pyriform, and sometimes reniform, (see *plate 8, a a a* ; *plate 19, figs. 1, 2*) ; its centre is an inch or an inch and a half in thickness, and it becomes thinner towards the circumference, where it presents only a few lines. It is six or eight inches in diameter ; and from eighteen to twenty-four in circumference. Its weight is about a pound, (see *plates 7, a a a, 19, figs. 1, 2, 3* ; *plate 20, fig. 1.*)

It has two surfaces, an *external* and *internal*. Its *external, uterine, or maternal surface* is attached to the uterus at some part of its cavity, at either side, anteriorly, posteriorly, superiorly, or inferiorly, but generally at the fundus, or the right side. Its uterine surface is soft, spongy, porous, and consists of several lobes (cotyledons) separated by fissures, named sinuses, and covered by a very fine membrane, (see *plate 19, fig. 1.*)

The *internal or foetal surface* is attached to the chorion, which adheres to the amnios, the latter at the centre or origin of the umbilical cord, from which it may be easily separated by traction, (see *plate 7, fig. 1* ; *plate 19, fig. 2.*)

At the end of gestation, the circumference of the placenta is insensibly lost on the uterus, and, on this account, is often detached with difficulty, (see *plate 19, fig. 3.*)

Organization of the Placenta.—Various eminent anatomists have maintained that the placenta was composed of two layers, a maternal and foetal, between which cells existed ; but this is denied by almost all modern writers. The objection to this doctrine is the existence of a membrane between the placenta and uterus, which is described by Arantius, Littre, W. Hunter, Lobstein, Chaussier, Meckel, Velpeau, and many other eminent anatomists among the moderns ; while it is rejected by Ruysch, Mary, Rohault, and others : I have repeatedly observed it.

The uterine portion was said to consist of arteries, which deposited the maternal blood in the cells, whence it was absorbed by the ramifications of the umbilical vein, and conveyed to the foetus. It will appear hereafter, that this doctrine is untenable.

The placenta was said to contain *lymphatics* by Wharton, Cruickshank, Mascagni, Wrisberg, De Michaëlis, De Schræger, and Lauth ; a point almost universally denied by the moderns. The existence of *nerves* in this organ is maintained by Verheyen, Chaussier, Sir E. Home, Bauer, and Ribes, but denied by anatomists in general. The white cords observed in the placenta, and said to be lymphatics and nerves, were proved to be obliterated vessels, by Velpeau, in 1823 (*Arch. Gen. de Med.*), and also by Carus, in 1827. In separating the uterine surface of the placenta, arteries and veins are divided, but no nerves or lymphatics.

Osiander, Stein, and others accounted for the situation of the placenta, by ascribing it to the position of the woman after fecundation ; but they forget that the ovule does not descend into the uterus for some days after conception. Velpeau offers an ingenious explanation.

He says, that if the decidua be more firmly attached at, or near the fundus, than lower down, the ovule will fall towards the cervix uteri ;

and, if the attachment be looser at the fundus than below the uterine tube, then the attachment will take place superiorly. These conclusions were drawn from thirty-four dissections, in twenty of which the centre of the placenta corresponded with the orifice, three times anteriorly, twice behind, and three times under one of the tubes, and six times only at the fundus uteri.

The actual mode of union of the placenta with the uterus is as yet a disputed point among physiologists. Some maintain that the great venous canals of the uterus are continuous with those of the placenta, (Northwyck, Astruc, Haller, Mary, Baudelocque, &c). (See *plate 7, c c c*; *plate 19, fig. 1.*)

The moderns hold, that villosities or fungosities are produced on the part of the uterus in contact with the chorion, and intermixing with those of the latter, form the placenta, (Wharton, Reuss, Stein, Asdrubali, &c.); while Velpeau and others, maintain there is a fine membrane between the uterus and the lobes of the placenta. Duges is convinced, that the spongy tissue of the placenta is nothing but an assemblage of the ramifications of the umbilical vessels and the filaments produced by the chorion; the maternal blood is effused into their interstices, which may be compared to the areolæ of a sponge, (Manuel d'Obstrétique.) According to this experienced author, the umbilical veins and arteries anastomose, an injection passes from one set of vessels into the other, if made from the arteries, but a certain portion of the placenta remains uninjected. We also find that we may render the placenta turgid, by injection through the foetal vessels; but some parts of it still remain uninjected, as the vessels do not pass all the way to its surface. If the injection be made through the uterine arteries, the placenta is affected in the same manner, but the umbilical vessels are not injected. Hence we may infer, says Professor Burns, in his last edition, 1837, that the placenta is composed of two portions. Dr. Williams, however, has injected linseed oil through the aorta and hypogastric arteries, which penetrated to the organs of the foetus; and Bianchini has frequently repeated this experiment. Other objections will immediately appear.

Wrisberg asserts that the arteries and veins of each lobe of the placenta anastomose, but have no connexion with those of the vicinal lobe.

The use of the placenta is to vivify the blood of the foetus, and to supply it, as will appear more satisfactorily, when I describe the foetal circulation and umbilical cord.

The placenta is sometimes scirrhus, ossified, hydatid, and hypertrophied, softened, and affected with fleshy tumours. In such cases there will be danger of hæmorrhage from retention of the organ, hysteritis, puerperal or typhous fever; and the child may be born alive, unless the disorganization is considerable. In twin cases there are two distinct placentæ, or one with two cords, or more commonly, a bilobulated organ, with vascular anastomoses, (see *page 131, plate 20, figs. 1, 2.*) It has been attached to the head of the infant, (*Nouv. Bibliothèque Med.*, 1830.)

The *circulation of the placenta* is also differently explained, (see *plate 7, fig. 1, a a a.*) Some say, the foetal arteries deposit the blood in the cells of the placenta, whence it is absorbed by the maternal veins, and carried to the maternal lungs to be vivified, and afterwards brought by

the arteries to the placenta. Others maintain, that a portion of the blood deposited by the umbilical arteries, is absorbed by the veins of that name, and returns to the foetus. M. Velpeau raises a formidable objection to the first opinion. He says, if the blood of the umbilical arteries is deposited in the placental sinuses, it must evidently mix with that of the uterine arteries, which is effused in the same place; it is therefore necessary to suppose that the absorbent mouths of the umbilical vein possess the faculty of choosing the arterial blood from this mixture, as the uterine veins do not take up but the venous blood. On the other hand, an injection will pass with the greatest facility from the arteries into the veins of the placenta, without effusing itself upon the uterine surface of that body, and, therefore, the blood of the foetus is not taken up by the uterus. It appears from the results of all anatomical injections, whether made from the maternal or foetal vessels, and even from both simultaneously, that there are certain portions of the placenta uninjected; and, therefore, there is not a direct communication between the circulation of the human female and the foetus in the womb. Moreover, it is well known to every obstetrician, that the pulse of a woman during the early stage of parturition, and in some cases during the whole of this process will be natural, varying from 70 to 78, while that of the fontanelle of the foetus, or of the umbilical cord, will be nearly double the number; and, therefore, the circulation of the mother and of the foetus is not continuous or direct, or to use a more scientific term, is not synchronous. Any obstetrician can determine this fact. It is a wise ordination of nature, that there should not be a direct circulation between the womb and the ovule or future being, when imperceptible to the human eye, and when the mental emotions or ordinary exertions of the mother would accelerate her circulation so much, as to derange or destroy the offspring in the first moments, hours, or days of its existence.

M. Velpeau remarks, and I fully agree with him, that experiments with injections on the dead body, do not prove the actual state of living parts. Thus, when a very fine injection is thrown from the arteries of the pelvis of a dead body, the injecting matter appears on the mucous surface of the intestines; introduced by the vena portæ, it not only returns by the hepatic arteries and veins, but by the excretory ducts of the bile. If forced through the renal artery, it not only passes into the emulgent vein, but also into the pelvis, and then into the urethra. Notwithstanding these facts, we cannot conclude that during life the blood continually transudes into the alimentary canal, or that it passes from the vessels of the liver into the hepatic ducts, or from the kidneys into the urethra. Professor Burns, who admits the vascular continuity between the placenta and the womb, has not prevented Dr. Blundell or Dr. Horner from denying a direct circulation between the mother and foetus, nor M. Bæer, from establishing the principle that in mammiferæ, the vessels of the mother are not continuous with those of the embryo. I have a preparation showing the placenta partly separated from the uterus, but the points of union are so intimate that it is utterly impossible to distinguish the line of demarcation. The uterine sinuses are distinct over the surface from which the placenta is separated. In cases in which the placenta is expelled entire, we often find that on

looking at its uterine surface, a fine membrane covers it, and this will be very evident by placing the placenta under water, and blowing on its uterine surface with a blow-pipe. These facts prove that the mode of transmission of blood from the uterus to the placenta is not direct, nor even clearly understood. Some are of opinion that the blood enters by simple porosities, or by a kind of imbibition, or that it is absorbed by the radicles of the umbilical vein, (Blumenbach Inst. Physiol.) This conclusion is liable to objections, as the experiments of Autenreith demonstrate, that the blood of the foetus has not the same appearance as that of the mother. It is more rosaceous, then becomes redder, and blacker, and is nearly of the same colour in the veins and arteries. Tiedemann and others have proved that the blood contains a greater proportion of serum than in the adult, which is less coagulable. It is generally agreed that the composition of the foetal blood is different from that of the adult. Lauth, jun., has arrived at the following conclusions:—1st., that there are between the decidua and the terminations of the vessels of the placenta, vascular filaments, which he thinks are lymphatics; 2nd., that these vessels are the only ones which can immediately communicate with the uterine ramifications; 3rd., that they are of two kinds, some taking up materials which have undergone an elaboration, and have thus become fit to nourish the foetus; the others which proceed from the placenta to the uterus, removing from the blood of the foetus such principles as can no longer be of any use to it.

M. Martin St. Ange, whose extensive researches in comparative anatomy on the circulation of the blood in the human foetus, and in four classes of vertebral animals, received the prizes of the Academie des Sciences in 1831-32, is of opinion, “that the circulation between the uterus and placenta is performed by endosmose or imbibition, viz: that the porous placental ramifications inspire the fluids deposited in the cells of the uterus, which fluids, in passing through the placenta, an organ of hæmatosis, acquire qualities for the nutrition of the organs of the foetus, and, consequently I am induced to deny the immediate communication between the vessels of the uterus and those of the placenta.” (Translation by T. W. Jones, M.D.) Endosmosis is maintained and defended by M. Dutrochet, in Professor Todd’s *Cyclopædia of Anatomy and Physiology*; and is formidably opposed by M. Raspail, in his admirable and unique work on *Organic Chemistry*. M. Velpeau arrives at the former conclusion, which is now most generally received. According to this indefatigable author, the foetus derives nutrition from the different sources. It is like a vegetable which imbibes from the circumambient humidities. The envelope on its periphery (see *plate 7, c c c*), is a true cellular sponge, which absorbs in the tube or womb, those nutritive principles which develop the vesicles, so that the embryo nourishes itself like the chick in the egg, or like a plant, from the principles in its cotyledons. The fluid contained in the umbilical vesicle gradually becomes thicker, (see *plate 5, fig. 5, e.*) The emulsive substance of the allantois, is gradually absorbed, (*b b.*) The vessels of the cord form about the end of the second month, and the placenta becomes developed for the evolution of the foetus. This spongy mass imbibes nutritive principles from the womb, which are converted into

a fluid more or less like blood, and this is absorbed by the roots of the umbilical vein, (see *plate 8, b b.*) The placenta extracts materials from the womb, which form the fluids of the foetus, as the liver, kidneys, and seminal glands extract bile, urine, and spermatic fluid from their vessels; and as trees and plants extract from the soil, the principles of the numerous substances which compose them.

M. Velpeau is inclined to suppose that the arterial blood of the foetus undergoes its changes by a molecular action in the placenta, which though inexplicable, may be still correct. He thinks it may be compared to the capillary system after birth; to what takes place in secretory organs, and in the lung itself. The fluids of the ovum are in immediate contact with those of the woman; but a change may take place analogous to that in the lungs between the atmospheric air and the venous blood.

Professors Burns, R. Lee, Radford, Millard, and many other moderns contend, that the placenta results from an intermixture of the uterine vessels with the decidua vera, or epichorion, while Professor Velpeau and others affirm with equal confidence, that the human placenta is entirely foetal, to which conclusion I agree.

It would be foreign to my purpose, in an elementary practical work of this kind, to give a more lengthened account of the various conclusions on Human Ovology, for which I must refer the reader to Professor Velpeau's unequalled work, for the fullest information,—*Embryologie, ou Ovologie Humaine, &c.*, 1833; and to the many other volumes which I have quoted in this article.

The *umbilical cord, navel-string, funis umbilicalis*, extends from the abdomen of the foetus to the membranes of the ovum and placenta, (see *plate 8, fig. 1, b, c.*) It was observed by Velpeau, in many cases, at the fifteenth day, (see *plate 5, figs. 4, 5, 6, 8*), and from that to the third week after conception.—About the fifth week it is composed of the vesicula umbilicalis, ompholo-mesenteric, or vitelline vessels, a portion of the allantois and intestines, (see *plate 6, fig. 1.*) At the second month, the intestinal canal enters the abdomen, the allantois and vitelline vessels are obliterated, (see *plate 6, figs. 2, 3*), and from the third to the ninth month, the cord is composed of two arteries, (see *plate 8, c c c*), one vein (*b b*), a gelatinous and spongy tissue, and an amniotic tunic. It was said that the cord contains lymphatics, (Diembroeck, Wrisberg, Schröeger, and Michaëlis), and nerves, (Chaussier, Reuss, Darr, &c.); but Velpeau is inclined to suppose these authors were deceived by the vestiges of the allantois, vitelline canals; and Lobstein and Meckel have also denied the accuracy of their researches.

There are sometimes but one artery and two veins, specimens of which were described by Blandin and Velpeau. The vein is double the size of the arteries, has no valves, and both are spiral from left to right, (see *plate 8, fig. 1, c c.*) The vessels of the cord may separate near the placenta or abdomen, and present a double cord, a fact attested by Velpeau and Deneux.

The cord presents other anomalies; it has been inserted into the head, chest, and extremities. M. J. Cloquet has seen the cord attached to the head, in the Anatomical Museum at Brussels. The length of the

funis at birth is generally about from fifteen to twenty inches; but it may be five or six feet, according to Mauriceau, Hebenstret, Haller, Wrisberg, Denman, L'Heritier, Morlanne, and Maygrier. It is of a greyish yellow colour, about the size of a small little finger in thickness; its veins are sometimes varicose; it sometimes presents nodosities, and is knotted, or is partially filled with hydatids. It may also be coiled round the neck, limbs, and body of the infant, and impede delivery.

CIRCULATION OF THE HUMAN FÆTUS.

Circulation of the Fœtus.—In whatever manner the blood or fluids arrive at the placenta, it is certain that they are conveyed into the circulation of the fœtus to nourish its different organs. It is also certain, that the fœtal circulation before and after birth is very different.

At a very early age, the heart of the embryo is nothing but a reservoir, composed of the umbilical vessels; at a later period, the right ventricle and pulmonary artery appear. When the organ is perfect, the circulation of the fœtus is said to be effected in the following manner:—

The umbilical vein arises from the placenta by innumerable branches (see *plate 8, fig. 1, a a a*), runs along the cord to the umbilicus of the fœtus, penetrates the abdomen behind the peritoneum, and then divides into two branches, at the transverse fissure of the liver (*e*). One proceeds to the vena cava inferior, and is called the ductus venosus (*g*); the other enters the right lobe of the liver, and anastomoses with the vena portæ, and afterwards unites with the hepatic veins which unite with the vena cava, where it crosses the diaphragm. Here then are three columns, that of the ductus venosus (*g*), that of the hepatic veins (*ii*), and that of the vena cava from the inferior part of the body (*h*). These columns unite and enter the right auricle (*j*), and through the foramen ovale, the left auricle, thence passing into the corresponding ventricle (*p*), and the ascending aorta (*t*), and to the head, and superior extremities. After having supplied these parts, the blood is returned by the jugular (*mm*), axillary, and subclavian (*n*) veins to the superior cava, which also receives that of the vena azygos, into the right ventricle (*p*), and thence into the pulmonary artery, which gives two small columns to the lungs, and conveys the rest by the ductus arteriosus (*s*), into the descending aorta, where it mixes with a part of the blood propelled by the left ventricle, and supplies the abdominal and pelvic viscera with the lower extremities, and returns by the umbilical arteries (*cc*), which run into the umbilical cord, and finally into the placenta, where their blood is deposited.

Much diversity of opinion exists with respect to the circulation of the fœtus. Haller, Wolf, Sabatier, Portal, and Richerand, say that the currents of blood from the inferior and superior cavæ do not mix in the right auricle, and that of the superior cava enters the right ventricle. Bichat Legallois, and Magendie dissent from this doctrine, and think it extremely improbable that two columns of blood can pass through the same cavity without intermixing; and as the two auricles contract simultaneously, it is not likely that the vivified blood of the umbilical vein goes entirely to the upper parts of the body, and that the venous

blood only supplies the remaining parts. But as the inferior cava surmounts the Eustachian valve, it appears to be continuous with the foramen ovale which simply opens into the right auricle, while the superior cava opens opposite the orifice of the right ventricle, on a plane somewhat anterior to the inferior cava, so that no such mixture of the blood of these vessels need necessarily take place either in the left auricle, or right ventricle.

The simultaneous contractions of the auricles do not appear to oppose this passage. It is not during the contraction of the cavities that the blood of the inferior cava arrives through the foramen ovale in the left auricle, nor that of the superior cava in the right auricle. If they are both filled with their respective fluids at the moment of contraction, what prevents them from allowing the blood to pass without mixture into the corresponding ventricle? It is therefore possible that only a certain quantity of the blood of the venæ cavæ is mixed in the right auricle.

Nevertheless, it is not correct to state, that the head and superior extremities are nourished by purer blood than the inferior parts of the body, or that the former are nourished by the blood of the superior vena cava; for it is to be recollected, that the blood of the umbilical vein is mixed with the venous blood of the abdominal viscera, through the vena portæ, and with that of the inferior extremities, by the ascending cava.

It is also to be remembered, that the blood in the descending aorta is derived from the ductus arteriosus, and also from the inferior cava; and, according to M. Martin St. Ange, whose account I shall presently give, the blood on arriving in the right auricle mixes with that of the superior cava before entering the left auricle, where it meets with that of the pulmonary veins, and thus the theory of Bichat is nearer the truth than that of Sabatier.

M. Martin St. Ange has published a splendid analytical table of the foetal circulation in the mammalia, to which I refer the reader: and I shall now give his graphic account of the circulation and course of the blood from the placenta to the heart of the foetus.

The following abridgement of the researches of M. Martin St. Ange, which have occupied him for several years past, and which gained two prizes from the Academie des Sciences of Paris, 1831-32, as the best treatise on the circulation of vertebral animals, is the most complete hitherto published, and therefore I shall quote it freely. This successful inquirer found all published plates illustrative of the human foetal circulation very inaccurate, and he therefore determined to collect into one treatise every thing that had any relation to the circulation of the blood in vertebral animals. He presents us with many splendid and beautifully coloured engravings in one very large plate, of the result of his researches on the foetal circulation; and his delineation of the foetal circulation in the human species is given in *plate 8*, which is also that of Professor Velpeau. (Atlas, 1835.)

Circulation from the Mother to the Fœtus, or from the Uterus to the Placenta.—This subject, on which anatomists have in all ages differed, is still a matter of dispute among modern physiologists; and, although the

immediate continuation of the uterine and placental vessels is almost universally denied, yet the mode of circulation from the mother to the foetus is still involved in much difficulty.

Among the ancients, Rouhault entertained an opinion, which approaches the nearest to the one I maintain. M. Comte has published a fragment upon the circulation of the foetus, and in that asserts, in accordance with Hunter, that the small ramifications of the umbilical vein absorb the maternal blood, and that those of the uterine veins absorb the blood which has passed through the foetus. This manner of considering the circulation from the foetus to the mother, or the reciprocal change of blood between the mother and the foetus, is a very old opinion, and I think, the least admissible of all of them. The following are the principal opinions that have been advanced until the present day: they are given in the order of their succession.

At the time of the discovery of the circulation of the blood, it was admitted, that an intermediate parenchyma existed between the uterus and the placenta, or the mother and foetus. Microscopical examinations, and particularly fine injections, soon caused this opinion to be rejected. Another now prevailed, that there was an immediate continuation of the arteries of the uterus with the veins of the placenta, and the arteries of this organ with the veins of the uterus; but when it was attempted to force mercury or any other substance from the arteries into the veins, or conversely, no satisfactory result was obtained, and this theory suffered the same fate as others which were not founded upon facts. As an explanation of this phenomenon was necessary, new hypotheses were offered. The next supposition was, that there were intermediate cells between the placenta and the uterus, for the purpose of receiving and transmitting the blood. Hence the umbilical vein drew nutriment for the foetus, and thence the veins of the uterus drew the blood deposited by the umbilical arteries. These cells were then supposed to be a common receptacle, where vessels, although of the same kind, took up different fluids. It is this mode of circulation that was admitted by M. Comte, without being supported by any new anatomical data.

We come now to facts better studied, or at least deduced from anatomical knowledge, that is to say, to those which have been developed by the researches of Dr. Lauth, jun., as to the vascular communication between the uterus and the placenta. This author admits: 1, that there are, between the tunica decidua and the termination of the vessels of the placenta, vascular filaments, which he thinks are lymphatics; 2, that these vessels are the only ones that can immediately communicate with the uterine ramifications; 3, that they are of two kinds, some taking up materials that have undergone an elaboration, and have thus become fit to nourish the foetus: the others (those which go from the placenta to the uterus) removing from the blood of the foetus such principles as can no longer be of any use to it.

My own opinion is, says M. St. Ange, after having investigated comparative anatomy, that the circulation is performed by *endosmose* or imbibition, viz.: that the porous placental ramifications inspire the fluids deposited in the cells of the uterus, which fluids, in passing through the placenta, an organ of hæmatisation, acquire qualities requisite for the nu-

trition of the organs of the foetus, and consequently, I am induced to deny the immediate communication between the vessels of the uterus, and those of the placenta—the Hunterian opinion.

Although this subject had long been studied, it was but in the last century, that a description, nearly correct, was given of the manner in which the umbilical vein conveys the blood into the vena cava inferior of the foetus, and afterwards into the heart. To show how much the opinions of the ancient anatomists were divided upon this point, it will suffice to mention those of the most remarkable authors.

Galen asserts, that the liver is formed only by the umbilical vein. Arantius, on the contrary states, that it is by the vena portæ. Herver affirms, that the umbilical vein opens into the vena cava, without previously giving off any branch to the liver. Eustachius, Fabricius, Riolan, Ruysch, Haller, Cheselden, Hobekenus, and Marchettis maintain, that about half the blood of the umbilical vein passes into the vena cava, and that the other half goes to the liver; but they have not described how this distribution takes place. Bertin opposed the opinions of his predecessors, and although his useful researches might have the appearance of leaving no doubt about the course which the blood follows in the liver of the foetus, yet they are neither complete nor always accurate.

Course of the Umbilical Vein.—This vein extends from the placenta to the liver of the foetus. Its length varies from three, to twenty-four, or thirty-six inches. A great number of branches form the umbilical trunk, (see *plate 8, fig 1, b b b*) which is dilated at its origin, and surrounded as far as the navel by the two umbilical arteries (*c c.*) Having reached the posterior surface of the liver, it at first occupies a portion of the longitudinal and then the transverse fissure. That part of this vein, which is situated in the longitudinal fissure, furnishes:—

I. Very small anterior branches for the convex portion of the liver.

II. Left lateral branches, for the corresponding lobe of the liver and the lobulus Spigelii. These are always directed from below upwards, and their principal ramifications cross, at right angles, the branches proceeding from the trunk of the venæ hepaticæ. In general, three or four of these inosculate with branches of the umbilical vein.

III. Right lateral branches, which are remarkable for their smallness and their termination: one or two of these vessels often inosculate with a branch, that arises from the ramifications of the umbilical trunk (see *plate 8, i.*)

It is important to be acquainted with the point where the umbilical vein leaves the longitudinal for the transverse fissure; for, at this point begins the canalis venosus, (*g*) or of Arantius, which, after occupying the continuation of the longitudinal fissure, opens at the junction of the venæ hepaticæ, into the vena cava inferior. The trunk of the umbilical vein, after giving off the canalis venosus, runs entirely through the transverse fissure of the liver, without being diminished in its size; sometimes it receives a branch from the lobulus Spigelii; but this takes place only when the vena portæ does not receive it.

The vena portæ, going from the left to the right, opens into the umbilical vein about the middle of the transverse fissure. The trunk then is dilated considerably, and ramifies into a great number of large branches,

which are thus distributed. The first is generally directed from below upwards, gives off a number of branches, and terminates in a trunk of the hepatic veins: the second dives into the substance of the liver, reaches its inferior surface, and opens by five or six small branches, into that portion of the vena cava which goes through the lobulus Spigelii.

As to the other branches, the first inosculates with an hepatic vein. I shall now examine the course of the hepatic artery and veins.

The branches of the hepatic artery being extremely small in the foetus, it is impossible to follow its extreme divisions; but it is demonstrated by injections, that its terminations communicate with those of the umbilical and hepatic veins. These last veins, consisting of four or five large branches, interlace with the umbilical branches. They all open into the vena cava inferior, immediately below the diaphragm.

The blood, which goes from the placenta to the foetus, is thus distributed in the liver. The blood that goes to the left lobe, the lobulus Spigelii and the canalis venosus (*g*), is pure; but that which goes to the right lobe is mixed, and is so, in consequence of the vena portæ opening into the umbilical vein (*f*). This fact, which hitherto had not been sufficiently established, accounts, as far as it goes, for the very considerable volume of the left lobe of the liver in the foetus.

The blood proceeding from the umbilical vein, the vena portæ, and the hepatic artery, is conveyed by the canalis venosus and the venæ hepaticæ into the sub-diaphragmatic portion of the vena cavæ inferior.

The anastomoses facilitate the circulation of the blood in the liver; and assist in continuing it in the transverse portion of the umbilical trunk, when, from any impediment, this latter one becomes obstructed at its curve. The anastomoses allow the blood to pass more freely from the umbilical vein into the vena cava inferior; and their function is analogous to that of the canalis venosus.

Such is, generally speaking, the circulation which takes place in the liver of the foetus at the age of six months. It is very nearly the same at all the periods of the foetal life, with the exception of a few changes in the disposition, the diameter, and the relations of the principal trunks.

At the age of six months, the caliber of the canalis venosus is greatly diminished, and the vena portæ has acquired nearly the same size as the umbilical vein.

At seven months, the angle formed by the vena portæ, and the umbilical vein is more open than it was till that time.

At eight months, the same angle is still more open. Finally, at nine months, the vena portæ has approached so much nearer the median line, that the angle, which it forms with the umbilical vein, is almost a right angle.

The greater or less inclination of the vena portæ to the umbilical vein is extremely important as to the circulation, for it gives a more favourable course to the direction of the blood during the whole period of gestation, but after birth, no longer does so. If it be carefully examined, we shall be easily convinced, that in the first case, the course of the blood is from the left to the right, in that portion of the umbi-

lical vein which is situated in the transverse fissure, and, that in the second, it flows from the right to the left.

But it is by examining the structure of the heart of the fœtus, that we can determine the course that the blood follows within the cavities of that organ: and which, having circulated thence through all parts of the body, returns to the placenta.

Harvey, Lower, and the greatest number of anatomists since their time until Mery, thought that the foramen ovale allowed the blood to pass from the right to the left auricle, and that the ductus arteriosus turned away the blood that was intended for the lungs. But, in 1649, Mery attempted to overthrow this system, which then generally obtained, and to prove that the blood of the left auricle passed into the right one. His opinion, then, was exactly the contrary, and was opposed by Sauvage. But Winslow considered the two auricles of the heart of the fœtus as only one, on account of the foramen ovale; and also, the two ventricles as one, in consequence of the ductus arteriosus. He thought that the blood of the two auricles was intimately mixed, and was afterwards distributed to all the organs of the body.

Lemery next opposed the opinion of Winslow, as well as that of Mery, and considered that the foramen ovale served only as a passage for the blood from the right to the left auricle.

Sabatier asserted, that the blood can only pass from the right auricle into the left one, but that the blood only of the vena cava inferior passes into the last cavity: while that of the vena cava superior flows into the right auricle and into the ventricle of the same side, without mixing with the other. Haller, Wolff, Portal, Richerand, Lerminier, Lepelletier, Hatin, &c., support the same opinion.

Lastly Legallois, in his learned article upon the heart in the *Dictionnaire des Sciences Medicales*, says, “that the blood must necessarily pass from the right to the left cavity, and that the blood of the vena cava superior and that of the vena cava inferior probably mix in the right auricle.” This was also Bichat’s opinion, which has been adopted by M. Magendie and some other physiologists.

These are the principal conclusions which anatomists and physiologists, who have investigated this important point of the circulation of the fœtus, have advanced. Nothing can be more uncertain than their theories, the same points having been, in turn, stated and opposed, reproduced and rejected.

The anatomical knowledge of an organ being the indispensable requisite to appreciate its functions, I shall begin the anatomical examination of the heart in an embryo, at a very early age.

At six weeks, the interior of the right auricle presents a very small oblong cavity, with smooth and very thin parietes, which seem to be the continuation of the two venæ cavæ. The Eustachian valve, which is now nothing more than the continuation of the anterior parietes of the vena cava inferior, rises up as high as the superior part of the foramen ovale, and forms a crescent, the concavity of which looks upwards. Its left extremity is attached to the internal pillar of the foramen ovale, and is continued with the small valve belonging to the coronary vein.

Its right extremity, adhering to the internal parietes of the auricle, is continued up to the orifice of the vena cava superior, which it covers; and at last loses itself upon the columnæ carneæ, which are placed above and within the opening of the vena cava superior.

Behind the valve, which forms in reality a partition, are the orifices of the two venæ cavæ, and the foramen ovale. This oval opening has two columns, one internal and the other external. The posterior parietes of the vena cava inferior pass behind the columns of the foramen ovale, and extend to its crescent. It is of importance to know this fact, because the greater number of anatomists have positively affirmed, that the valve of the foramen ovale describes a curve, the concavity of which is upwards; and that from this arrangement there results a permanent, free, and circular opening. Now the truth is, on the contrary, that the crescent, formed by this valve, disappears the moment the auricles are completely filled with blood, and thus the occlusion of the foramen ovale ensues.

At two months, the right auricle becomes larger: it can then be examined with the naked eye. The crescent of the Eustachian valve now describes a larger curve, which establishes a freer communication between the posterior and the anterior cells of the auricle. As to the blood of the coronary vein, it is always poured into the anterior cell, its opening being in front of the Eustachian valve.

At two months and a half, the auricle is much more developed. The orifice of the vena cava superior is found higher up, the Eustachian valve however, still covers it; but as the valve does not follow the progressive developement of the auricle, it covers the foramen ovale less, in proportion as the period of conception is more advanced.

Towards three months and a half, the Eustachian valve extends very little over the orifice of the vena cava superior, and the blood, proceeding from this vein, passes more freely into the anterior cell of the right auricle. This change does not prevent the mixing of the blood; but, instead of its taking place in the posterior cavity, it does so in the whole of the auricle.

At five months, the Eustachian valve does not appear any longer to extend beyond the circumference of the vena cava superior; it appears to lose itself upon the internal parietes of the auricle: this allows a still more free communication between the posterior and the anterior cells of the right auricle.

After the sixth month, the Eustachian valve covers only the lower quarter of the foramen ovale, and becomes proportionally smaller as the foetus increases in age. At the ninth month, it allows the whole of the circumference of the foramen ovale and the orifices of the two venæ cavæ to be uncovered. It is not so with the valve of the foramen ovale, which being very much developed, adheres to the circumference of the foramen, so as to leave only a small aperture at its upper part.

Thus, we have seen, that very remarkable changes take place in the heart of the foetus during its evolution. These changes having been once well ascertained, it is impossible to be mistaken as to the course which the blood must take within the cavities of the heart.

With regard to the use of the Eustachian valve, it can easily be de-

duced from its developement, which is in an inverse ratio with that of the other organs. We have seen, that in the early age, it almost completely covers the foramen ovale and the orifices of the two *venæ cavæ*, while, at a later period, it leaves them entirely uncovered. From this change it is evident, that its function in man is to favour the mixing of the blood of the two *venæ cavæ*; to direct the greater part of it into the left auricle; to prevent its influx into the *vena cava inferior* during the contraction of the auricles.

The use of the foramen ovale consists in allowing the blood to pass from the right into the left auricle: its valve proportions the quantity of blood that should pass into the cavity of the auricle, and puts a stop to that communication after birth. As to the ductus arteriosus, it is evident that it conveys the blood into the aorta, in order to turn it away from the lungs.

From these anatomical investigations we may be surprised to find, that such a difference of opinion has existed until the present day, with regard to the manner in which the circulation in the foetus is performed. The following is, I consider, the manner in which it really does take place:—

If we suppose that the auricles are contracted, and that the diastole immediately follows, the auricles become evacuated, and the blood pours into them by the *venæ cavæ*, the coronary and the pulmonary veins. The left auricle, which cannot be sufficiently filled with the blood which the pulmonary veins convey to it, draws it from the right auricle through the foramen ovale. While the left auricle thus draws the quantity of blood necessary to fill it, the right auricle is filled with mixed blood proceeding from the two *venæ cavæ* and the coronary veins. The auricles, stimulated by the blood which they contain, contract, their cavities empty themselves, in order that those of the ventricles may be filled: during the contraction of the auricles, the blood endeavours to return by those openings which gave it a passage; the right auricle forces it towards the *venæ cavæ*: but this reflux is stopped, in a great measure, by the Eustachian valve. The left auricle also repels the blood towards the foramen ovale, but the valve of the foramen ovale prevents its returning, and this in proportion as the foetus grows older. In this way, the blood of the auricles finding obstacles to its return, passes into the ventricles by the auriculo-ventricular orifices.

The ventricles contract in their turn, as soon as they have received the blood from the auricles, and propel it thence into its proper vessels. The blood is prevented returning into the auricles by the mitral valve, placed at the left auriculo-ventricular orifice, and by the tricuspid valve placed at the right auriculo-ventricular orifice. The blood of the right ventricle passes into the pulmonary trunk, which is furnished at its origin, with three semi-lunar or sigmoid valves, to support the column of blood. A little above these valves, the right pulmonary artery branches off, (*r*); and, a little further, the left one: after which the trunk continues, under the name of ductus arteriosus, and opens into the descending aorta. This last artery, which emerges from the left ventricle has also at its origin, three semilunar valves, whose functions consist in supporting the column of blood propelled into the aorta. It

is in this way only, that the blood passes through the cavities of the heart; for, according to the description that has been given of the structure of this organ, it cannot take any other direction.

DISTRIBUTION OF THE BLOOD IN THE ORGANS OF THE FŒTUS.

Arteries that arise from the Aorta.—The aorta, which arises from the left ventricle, gives off after the sigmoid valves, the coronary arteries, the arteria innominata, the left carotid, the subclavian of the same side, and sometimes a branch for the thymus gland.

Between the carotids and the internal jugular veins are seen the pneumogastric nerves.

The thoracic portion of the aorta gives off the bronchial, the œsophageal, the mediastinal, and the intercostal arteries. These last eight branches correspond to eight similar ones on the opposite side.

The abdominal portion gives off the diaphragmatic arteries; the cœliac artery, which divides into three branches, the coronaria ventriculi, the hepatic, and the splenic; the superior mesenteric, the inferior mesenteric; the supra-renal arteries; the emulgent or renal; the spermatic, and the lumbar.

After giving off these arteries, the aorta bifurcates into the iliacs. Between them emerges the middle sacral. Each iliac artery afterwards divides into the internal iliac or hypogastric, which in the foetus extends further under the name of umbilical arteries, (*c c*) and the external iliac arteries. The former, after furnishing several branches to all the organs of the pelvis, carry back to the placenta the blood that the umbilical vein had brought to the foetus. They turn away the greater part of the blood that should pass through the femoral arteries, and thus determine the extreme smallness of the abdominal extremities.

The pulmonary trunk (*s*) divides into three branches; which are, the pulmonary arteries, and the ductus arteriosus. The first two carry blood to the lungs, the second to the aorta. The blood, thus distributed into the different organs, returns to the heart, by the vena cava superior (*k*), which receives the internal jugular, (*m m*), the subclavian veins and the vena azygos, by the vena cava inferior (*h*), which receives the iliac, the renal, the right spermatic, the lumbar, the supra-renal, the hepatic veins and the canalis venosus (*g*); and lastly, by the pulmonary veins.

The branches which open into the trunk of the vena portæ, remain still to be indicated. The splenic vein, which is the principal branch of this trunk, receives the veins corresponding to the vasa breviora, the left gastro-epiploic, the pancreatic, the coronaria ventriculi and the inferior mesenteric, which receives the branch proceeding from the left portion of the transverse arch of the colon. The superior mesenteric which unites with the splenic to form the trunk of the vena portæ, receives all the branches of the small intestines, the branch from the right half of the transverse arch of the colon, the branch duodeno-mesenteric, the right gastro-epiploic and a small branch from the gall-bladder, which, after uniting with the pyloric vein opens into the trunk of the superior mesenteric.

If the circulation of the foetus and that of the adult, be now com-

pared, the principal differences will be seen to consist : 1st., in the entire disappearance of the ductus arteriosus and canalis venosus : 2nd., in the obliteration of the umbilical arteries and vein : 3rd., in the increase of caliber of the hypogastric and femoral arteries : 4th., in the angle of the vena portæ with the umbilical vein, which is much less oblique : 5th., in the complete separation of the two auricular cavities : and, 6th., in the opposite direction the blood follows in going through that part of the umbilical vein which is situated in the transverse fissure.

All these changes do not occur immediately after birth ; the ductus arteriosus and the foramen ovale in general remain open until the eighth day, a most important fact in cases of alleged infanticide : the foramen ovale sometimes persists during the whole life, and from this results the disease called cyanosis. The only change that happens immediately after birth, is the passage of the blood from the right to the left, in the portion of the umbilical vein situated in the transverse fissure.

It is easy to account for the efficient causes of the metamorphoses in the foetal circulation. The atrophy of the ductus arteriosus is very well explained by the revulsion of the blood, which the pulmonary arteries effect for the advantage of the lungs. The complete obliteration of portions of the umbilical arteries is, in like manner, conceived from the increase of caliber of the hypogastric and femoral arteries. The occlusion of the foramen ovale, and the almost entire disappearance of the Eustachian valve, have already been explained elsewhere. I have given a very minute account of the changes in the foetal circulation in another work,—*Manual of Medical Jurisprudence*, 2nd. Edition, 1836.

It is less easy to assign the cause of the obliteration of the canalis venosus. But, considering that the blood no longer directly flows into this vessel by the umbilical vein, this obliteration becomes possible, and is effected from the eighth to the fortieth day.

SUMMARY OF THE CIRCULATION OF THE FŒTUS.

The small venous branches of the placenta draw, by imbibition or *endosmose* (*a*), from the cells of the uterus, the materials fit for the nutrition of the foetus, which the placenta modifies. The blood of the placenta is conveyed to the foetus by the umbilical vein, (see *plate 8, b b b*) : it goes, in a pure state, to the left lobe of the liver, the lobulus Spigelii, and the canalis venosus (*g*), it then mixes with that of the vena portæ (*f*), and goes through all the right lobe of the liver. It is afterwards conveyed by the venæ hepaticæ into the sub-diaphragmatic portion of the vena cava, where it meets the blood coming from the ductus venosus, that of the vena cava itself, and that of the diaphragmatic veins : thence it passes into the right auricle (*j*), mixes with that of the vena cava superior and the coronary veins ; then passes, in a greater or less quantity, according to the age of the foetus, into the left auricle by the foramen ovale, where it meets with the blood coming from the pulmonary veins.

The simultaneous contraction of the auricles propels the blood, which they receive, into the corresponding ventricles. The right ventricle forces a small quantity of it through the lungs, and a larger quantity into the ductus arteriosus. That of the left ventricle passes into the

arch of the aorta, where the blood of the ductus arteriosus has already been poured, and is distributed to the different organs.

A great part of this blood, having reached the bifurcation of the iliac arteries, goes to seek, by means of the placenta, the fresh materials that are necessary for its modification, and returns to the heart, by the umbilical vein.

Such is the system of the circulation of blood in the foetus; and it is easy to see how materially it differs from that maintained by certain other modern physiologists.

DEVELOPEMENT OF THE GRAVID UTERUS.

It is universally admitted by modern physiologists, that the womb becomes excited at and after the moment of conception, and continues to enlarge and nourish the foetus until the time of parturition. It is therefore necessary to compare its developement after conception with its condition in the unimpregnated condition. I have already described the virgin and unimpregnated uterus, (see p. 48, *plate 4, fig. 1,*) and shall now consider the changes it undergoes during pregnancy, (see *plates 9, 10, 11, 12,*) when, with its contents it nearly fills the whole abdomen. (see *plate 12.*) When we compare the womb before conception, (see *plate 4, fig. 1,*) and before delivery, (see *plate 12,*) we must be astonished at the great difference in size; and we must still be more surprised at the rapid reduction of the organ to its primitive size in a few days after parturition.

It has been already stated, that the reproductive organs are excited, and contain more blood during coition, than in a quiescent state; and this determination of blood to the womb continues from the instant of conception to birth of the infant, and gradually diminishes for some few days afterwards, while it is directed to the breasts, when the womb will be restored to its unimpregnated size. (see *plate 4, fig. 1; plate 11, figs. 1, 5.*)

This increase in the supply of blood is necessary for the developement and nourishment of the embryo and its connexions, (see explanations of *plates 5, 6, 7, 8.*) As the embryo enlarges so does the womb, from an increased determination of blood to its structure, and, accordingly, we find it differing in size in proportion to the developement of the foetus—a fact which greatly assists us in determining the existence or non-existence of pregnancy, (see explanation of *plates 9, 10, 11, 12,*)—a point of great importance in private practice, and in many judicial enquiries in most of the courts of justice.

The increased quantity of blood in the womb during pregnancy not only enlarges the organ itself for the reasons already stated, but a sufficient portion of the vital fluid is transmitted into a vascular connexion formed between some part of the cavity of the womb, then to the membranes, and to the circulation of the foetus, (see *plates 5, 6, 7, 8,* and page 131.)

The developement of the womb after conception is gradual, and its size will necessarily vary according to the stage of pregnancy.

During the first three months, the womb is lower in the pelvis, than in the unimpregnated state, in consequence of the increase of size and

weight, and we can more readily feel its orifice. At the fourth month, but in some cases not sooner than the fifth, the fundus or superior part of the womb (see *plate 4, fig. 1, a*.) ascends above the pubis and brim of the pelvis, and measures about five inches from this part to the commencement of the neck. The enlargement is now confined to the body and fundus; but in the fifth month the cervix becomes developed, much softer, and spongy. As the uterus at this period rises into the abdomen, the vagina also becomes more elevated, and the uterine orifice more distant from the finger.

At the fifth or the fifth month-and-a-half, the fundus is generally found mid-way between the pubis and the navel, and is in most cases easily detected, unless in corpulent or large women.

At the sixth month, the fundus is as high as the navel, (see *plate 9, fig. 2*): at the seventh, about an inch or two higher; at the eighth month, the fundus is about midway between the navel and the epigastrium, or pit of the stomach; and at the ninth, it is near the inferior portion of the ensiform cartilage, (see *plate 9, fig. 3*, and *plate 10, fig. 3*.)

The gradual developement of the cervix or neck of the womb in the different months of pregnancy, deserves serious attention, as it materially assists the medical practitioner in determining the existence and advance of pregnancy. I have accordingly introduced engravings of the orifice and neck of the womb in the virgin state, (*plate 11, fig. 1*); in the third month of pregnancy, (*fig. 2*); in the sixth month, (*fig. 3*); in the ninth month, (*figs. 4, 6*); and in a woman who has been pregnant, (*fig. 6*). I need not state that in no two cases are the developements exactly alike. At the sixth month, the neck of the womb participates in the development of the remainder of the organ, becomes much shorter than previously, and continues to expand until the ninth month, when the orifice becomes a small slit or round hole, (see *figs 4, 6*, and *plate 12, b b*). It is this expansion of the neck of the womb, between the seventh and eighth month of pregnancy, which separates the womb from the surface of the placenta when directly over the orifice, and causes profuse hæmorrhage in certain placental presentations, (see *plate 39, figs 1, 2, 3*). The womb, at the full term of pregnancy, as well as in the unimpregnated state, is of an oval shape, slightly compressed from before backwards, and with the smaller extremity pointing downwards, (see *plates 12, 13, figs. 1, 2, 3*). It usually measures twelve inches in length, nine in breadth, and six or seven in depth; but these dimensions will vary according to the size of the woman, foetus, its secundines, and especially to the quantity of the liquor amnii, or fluid which surrounds the infant in the womb. It is a common and correct remark, that women, even the same persons, vary in size in different pregnancies. Every experienced obstetrician can attest it.

The situation of the fully developed womb is oblique, with the orifice directed downwards and backwards towards the sacrum, (see *plates 12, 13*); the fundus forwards, so that its axis is nearly identical with that of the brim of the pelvis, (see *plate 2, fig. 1, e e*), an imaginary right line passing from the scrobiculus cordis, epigastrium, or pit of the stomach in *plates 12, 13*, or from the navel in *fig. 2*, to the sacro-coc-

cygeal joint; and it is in the course of this line, that the womb, when contracted during parturition or labour, propels the head and body of the foetus in the beginning of parturition, (see *plate 2, fig. 1, p. 25.*)

The axis of the womb will vary in consequence of the distensibility of the abdominal parietes in women who have had no children, or the womb may project more on one side than on the other, and also on account of deformities of the spine or pelvis.

The gravid womb lies anterior to all the viscera in the abdomen, (see *plate 12*), occupying the greater part of the abdomen, as well as the space between the hip-bones.

The infant presses the womb immediately against the parietes of the abdomen, a fact to be recollected in abdominal dropsy, (ascites), and during pregnancy, which deters the obstetrician from tapping, unless the destruction of life is imminent. I have known a case in which pregnancy was supposed to be abdominal dropsy; tapping was performed, and labour suddenly induced; and another in one of our hospitals, for which the same operation was to be performed on a certain day; but the woman, for reasons best known to herself, left the house on the preceding evening, and was delivered next day. The medical attendant called to remonstrate with her, but was astounded on learning the result.

The increasing determination of blood to the womb, from the moment of conception, is the cause of the increase in size of the organ, and of the foetus. The structures of the organ are essentially the same as in the virgin and unimpregnated conditions. The substance of the uterus becomes thicker, more spongy and vascular, and the blood-vessels are much more developed than before conception. These are very much enlarged, arteries as well as veins, near the site of the placenta, at which they are, together with the sinuses, as large as a goose's quill, or even as the point of the little finger. Lastly, the veins form plexuses, which freely communicate with each other.

The lymphatics are enlarged, and very numerous.

The nerves, which are derived from the hypogastric and spermatic plexuses of the great sympathetic, as well as from the sacral plexus, are said to be enlarged by some authors, (W. Hunter, &c.); but this is denied by Jörg and others.

The fibres of the uterus, which in the virgin and unimpregnated states are so obscure, now become distinct, and evidently muscular. The external of these muscular fibres are said to arise from the round ligaments, regularly diverge, and spread over the fundus until they unite. Sir Charles Bell is of opinion that the round ligaments are the tendons of this muscle, and serve as fixed points from which it acts, in bringing the womb down into the pelvis at the commencement of labour, and also in giving its mouth the proper direction, (*Med. Chir. Trans.*, vol. iv). This opinion remains to be proved.

The muscular fibres internal to this layer in the substance of the womb, have a circular direction near the fundus, and a longitudinal one near the cervix, but are so intimately interwoven with each other, that when they act fully, they powerfully constrict the blood-vessels which pass between them, and by this means prevent hæmorrhage.

Their conjoint action during labour is said to compress the contents of the womb, to open its inferior orifice, and to draw this over the head, neck, body, and limbs of the fœtus.

The internal layer of muscles has its fibres arranged with two sets of concentric circles, each of which has the orifice of one of the uterine tubes as its centre. These two layers or muscles, intimately interweave at their circumferences, and have proceeding from them on each side, broad longitudinal bands of fibres, which co-operate with the external muscles in bringing the fundus or upper part of the womb towards its inferior orifice or mouth, and drawing the latter over the infant's head and body, (see Parturition).

The circular portions are also supposed to corrugate and diminish in size; the internal surface of the uterus, immediately after the infant has been expelled, and thus separate it from the placenta, which having no power of diminishing its own size, must necessarily be separated from the part of the womb to which it may be attached, while the cavity of the latter organ is being diminished in the way mentioned. Such is the manner in which the placenta is separated from the womb after the birth of the infant, and it is totally expelled by the further contractions of the organ, as will be more fully explained hereafter. The size of the womb, after the birth of the infant, is gradually and speedily reduced by the muscular contractions of the organ to its state in virgin and unimpregnated conditions; and the reduction is so complete, that it would be impossible to decide whether the person was a virgin or not.—This is a fact well known to every well-informed obstetrician, and shows the wisdom of nature in adapting the respective organs to each other, even after the repeated births of several infants. It is a medical axiom, that it is impossible to distinguish by examination of the external genital organs whether a woman is a virgin or not; and even cases have repeatedly occurred in which the most experienced medical practitioners had declared women virgins who had lived prostitutes for ten, twenty, or thirty years.—(Capuron, Beck, Duchatelet, Ryan, &c. &c.)

CHAPTER VIII.

SIGNS, PROGRESS, AND DURATION OF PREGNANCY.

THE subjects about to be considered are of great importance to society, as they may affect the honour and character of husbands and wives, the peace of families, public morals, the administration of justice in cases of reprieve, criminal abortion, caused by assault or other means, and likewise in cases of infanticide, legitimacy, and recent delivery. I have minutely described these, and all other questions relating to them, in my work on Medical Jurisprudence; and shall now give a summary of the conclusions on the subjects more immediately belonging to this chapter.

Medical practitioners are daily consulted in cases of supposed, imaginary, nervous, and concealed pregnancy, and should be able to form a correct opinion, so far as the present state of science will permit. It is a great injury to professional fame to commit a mistake and declare a woman pregnant or in labour, who is in neither condition, but suffering from disease.

I may here observe, that there is not a question in the whole domain of medicine so difficult to be determined, as the existence or non-existence of pregnancy, embracing the exact period of conception,—a question that cannot be answered positively by any medical practitioner during the first three months after the alleged period of sexual intercourse. This, I believe, is the present opinion of all learned and experienced medical practitioners. The difficulty arises from the slow and almost imperceptible progress in the developement of the womb, during the first three months of pregnancy, from the difference in size of the organ in different women, so that in fact the whole of the symptoms of pregnancy must be present and duly appreciated to warrant a correct conclusion. It is also well known to obstetricians, that no married or pregnant woman, can ever positively determine the existence of a future pregnancy, during the first three months; and, therefore, the reference of the question of the existence or non-existence of pregnancy at that early period to a jury of matrons alone, is useless and mischievous, and ought to be discontinued. In most diseases, medical evidence only can be relied on, and even this is not to be invariably depended upon, for it may, and has been wrong on some occasions, although generally correct.

How often do we meet with cases of suspected pregnancy, when there is morbid enlargement of the womb, ovaries, liver, spleen, and various tumours in the abdomen, ovarian and abdominal dropsies; while every experienced obstetrician knows that some of these diseases may also exist during pregnancy, and render the diagnosis extremely difficult.

A great variety of signs are to be carefully estimated before a medical practitioner can arrive at a correct conclusion as to the existence or absence of pregnancy, and these deserve due consideration.

It is first to be determined, what is the earliest and latest age, in this climate, at which pregnancy can occur. This inquiry is not easily answered. It has been recorded in France, that during the reign of terror, or the revolution which commenced in 1789, boys and girls of ten years of age, were parents. It is also stated, that both sexes may have offspring at even an earlier age in tropical climates. A girl, aged nine years, was said to have been a mother in France, during the above period. It is likewise attested, that girls between twelve and thirteen years of age have been pregnant in this country, and I have been assured of examples. Another question is sometimes discussed in courts of justice, whether a woman, aged sixty years, can be a mother at that period of life in this climate.

A case of this kind was tried in the Court of Chancery, London, 1834, on the decision of which a large property was to be awarded; but the court did not determine the question, which was decided without

fixing the exact period of female fecundity in this kingdom. (see the Author's work on Medical Jurisprudence, 1836.)

But it is not as yet determined by the medical faculty in this or any other country, so far as I know, what are the exact ages at which fecundity ceases in either sex : and little, if any reliance can be placed on the statements of the majority of travellers. The following cases show the difficulty of determining the precise ages at which sexual impulse ceases. (See also Author's works on Marriage, Prostitution, and Medical Jurisprudence, already quoted.)

It is recorded that Thomas Parr was compelled to do public penance at one of the churches for an amour, the result of which was an illegitimate infant, when his age was one hundred-and-twenty years ; but there is no positive or legal proof that he was really the father, although declared to be the putative one by one of our law courts.

I copy the following cases from the leading London Press of November, 1839 :—

“Married, at Ringley Chapel, near Bolton, Mr. James Holt, a gay Lothario, in his NINETIETH YEAR, to Mrs. Mary Heywood, aged SEVENTY-SIX !

I shall not comment upon cases of this kind further than to observe that such marriages are generally unhappy, there is seldom affection or offspring, and generally a violation of morals, (see *Philosophy of Marriage*, 3rd. Edition, 1839.) I shall only insert two other remarkable cases :—

“Married, Oct. 7, 1839, at the old church, Burton-upon-Trent, George Lane, aged 46 years, and Sarah Woodward, aged 86 years, who was accompanied by her grand-daughter.”

“MARLBOROUGH ST. POLICE COURT, LONDON, OCT. 18, 1839.—A gentleman, aged twenty-five years, married a lady aged seventy years, and had an infant affiliated to him by one of his servants,—the usual consequence of unions “between January and May.”

Questions not only of paternity, but of bastardy and female violation, when impotence may be alleged, are sometimes to be determined in cases of aged persons, in which medical evidence may be required. These I have fully considered in the works already quoted. The reader will find many other examples in the writer's book on Marriage, in the Chapter on “Late Marriages.”

But the most common question to be solved by physicians and surgeons is, whether pregnancy does or does not exist ; and to determine it all the proofs or signs of pregnancy must be carefully examined.

Pregnancy is defined the condition of a woman who has conceived, and carries the product of conception in her womb or abdomen. Natural pregnancy continues until the time of delivery, which is generally about the end of the tenth lunar or ninth calendar month and a week, while some say two hundred and seventy, and others two hundred and eighty days, or ten lunar months ; but sometimes the period is more protracted.

Some extend the period of natural delivery to the tenth, eleventh, or fifteenth lunar month. Every experienced physician or surgeon knows that women are often out in their reckoning one, two, three, five, and even six weeks. It is a remarkable fact, that the computation of time and of the duration of pregnancy by the ancients and moderns is exactly the same, as will appear by comparing the old and new styles.

Pregnancy is divided into *true* and *false*. The first exists when there is one or more foetuses in the womb; the second, when the womb, ovary, or other organs and abdomen enlarge independently of pregnancy.

Real pregnancy may be still subdivided into *uterine* when the foetus is in the womb; *extra-uterine* when it is not in the womb, but in the ovary, tube or abdomen; and *interstitial* or *mixed* when it is in the substance of the womb itself.

Uterine Pregnancy.—This term is employed when the foetus is in the cavity of the womb, as in natural cases. It is called *simple* when there is but one foetus, *plural* when there are more than one, and *complicated* when there is one or more foetuses, as also when the womb contains an unusual quantity of fluid, (hydramnios) a mole, a polypus, hydatids, &c.

Signs of Uterine or Real Pregnancy.—These are moral and physical, local and general. The local are suppression of the menses, and remarkable changes in the womb and abdomen. There is also a general disturbance in many or all the functions of the organs in the body, caused by the sympathy between the womb and all other parts. It is a correct axiom that every part of the body is connected by nerves, and hence, disorder or disease in any one part, may more or less derange the whole. No one but an individual acquainted with anatomy, physiology, and pathology, can clearly comprehend this position, although it is perfectly correct. I have proved it by many illustrations in *The Physician's Vademecum*, 11th edition, 1837. Anatomical plates show the nervous connexion between every part of the body; and every rational adult must admit, on a moment's reflection, that pain in any part of the body will derange the functions or uses of the whole. It is for this reason that head-ache, ear-ache, eye-ache, tooth-ache, chest-ache, stomach, liver, spleen, kidney, and all other aches, more or less depress the mind, derange the appetite, as well as the functions of vision, hearing, taste, smell, touch, respiration, circulation, inducing palpitations, faintness, depraved appearances of the alvine, urinary and uterine secretions.

Now, as it is computed that in all civilized countries, there is not more than one person of either sex in twenty in perfect health, it clearly follows that the many disorders caused by pregnancy, both moral and physical, must give rise to a vast number of unpleasant sensations in all parts of the body in different individuals, whose constitutions vary; and experienced physicians find this the case, as will appear by the following facts, as regards the signs of pregnancy:—

Suppression of the Menses.—There is suppression of the menses, or periodical female health, in most cases of pregnancy; but this often happens when conception has not occurred, and from a variety of causes, such as mental emotions, exposure to cold or damp, &c. &c.; and this sign is, consequently, not a certain proof of pregnancy. It is also to

be recollected that some few pregnant women have a periodical discharge every month, which coagulates, and is therefore not menstrual. (See pp. 62, 63, 65, 71).

The following very singular case occurred to my respected correspondent, Mr. Wardleworth, surgeon at Rochdale, with the particulars of which he kindly favoured me, Dec. 1839, since the publication of my description of menstruation, *vide ante*, pp. 58, 75.

Mrs. —, a stout healthy individual, aged fifty-two years, married at eighteen, and menstruated for the first time on the day she completed her nineteenth year, without the usual premonitory signs, the secretion being very sparing and florid, and only continued for one day. At the termination of the ninth lunar month afterwards, she was delivered of an apparently full grown infant, according to her account, and has had no menstruation or infant since.

Changes in the Size of the Uterus and Abdomen.—The enlargements of the womb and abdomen are popularly considered presumptive proofs of pregnancy; but they may be caused by a variety of diseases in the absence of that state. The changes in the uterus, induced by pregnancy, are remarkable as regards the size, position, direction, and textures or tissues of the organ. When conception occurs, the womb gradually increases in size, (see *plate 9, figs. 1, 2, 3; plate 10, figs. 1, 2, 3*), and at the end of pregnancy usually measures longitudinally, about ten inches, transversely nine inches, and antero-posteriorly, eight inches and a half. These measurements will vary in different cases, in proportion to the size of the individual. (see *plates 3, 4, 12.*) It has also been satisfactorily proved, that the womb after conception has occurred, receives an increased quantity of blood which causes its enlargement, that it possesses an increase of heat and an exquisite sensibility, and that it finally becomes capable of powerful contractions, now generally considered muscular, and necessary for the expulsion of the foetus and its appendages, the membranes, and placenta or after-birth.

It is here important to observe, that there are two causes of uterine developement,—the increased determination of blood to the womb from the moment of conception to the termination of parturition, and the dilating action of the foetus, especially towards the end of pregnancy. The changes in the structure of the organ are in its colour, thickness, density, the developement of the membranes and placenta, of the arteries, veins, lymphatics, and nerves.

The womb in the unimpregnated state is of a whitish flesh colour, but as pregnancy advances becomes of a deeper red, in consequence of the increased quantity of blood sent to the organ. The thickness of the womb is increased from the instant of conception, and especially in that part to which the placenta is attached. The difference between the unimpregnated and gravid uterus will be apparent by reference to *plate 3, fig. 2, plate 4, fig. 1, and plate 12.*) Towards the end of pregnancy, the parietes or walls of the womb are generally very much thickened, but when over distended by twins, or a superabundance of amniotic fluid, or “waters,” they are sometimes partially thinned. The tissue of the organ now becomes softer and more vascular from the time

of conception, and continues so until the lapse of ten or more days after delivery.

The peritoneal covering expands with the uterine developement, the broad ligaments formed by it are also spread out and become expanded on its surface. The peculiar tissue of the uterus is now fibrous and muscular, the fibres running transverse, longitudinal, and oblique, (*vide ante* p. 50.) They all form planes, which are not easily understood. The mucous or lining membrane becomes reddish, enlarges, its follicles increase in size, and there is an increased secretion, especially about the neck of the womb, (*vide ante* p. 57.)

The cellular tissue of the womb also developes very remarkably, its fibres become elongated, and its areolæ are much larger.

The arteries are less tortuous as the organ developes, and their calibre is much increased.

The veins are still more considerably enlarged, especially in the part to which the placenta is attached, and in some instances will admit the tip of the little finger. Hence, most anatomists and obstetricians have denominated these enlargements, sinuses.

The lymphatic vessels, which are very numerous, become considerably increased in size, and are sometimes as large as a goose-quill.

The nerves also enlarge very much, a fact which was first attested by Hunter.

The womb soon after conception becomes more or less depressed in the cavity of the pelvis, but it soon rises towards the abdomen. Its fundus, at the third month is on a level with the superior margin of the pubic or share bones; (see *plate 9, fig. 1*; *plate 10 fig. 1*;) at the fourth it is some inches higher, often midway between the pubis and umbilicus or navel; at the fifth month, it is about two inches below the umbilicus; at the sixth month, a little under or on a line with the umbilicus, (see *plate 9, fig 2*; *plate 10, fig 2*); at the seventh, it is in the inferior part of the epigastrium, and an inch or two above the navel; and at the eighth month, it is in the middle of this region; and at the ninth month, it is at the pit of the stomach; (see *plate 9, fig. 3*; *plate 10, fig. 3*;) but during this month, the womb almost always descends more or less, and particularly as parturition approaches, (see "Signs of Parturition," hereafter.)

It is also important to state, that the womb does not always ascend in the degrees now mentioned, as in cases in which the parietes of the abdomen had been greatly dilated by former pregnancies, or by dropsies, in which the fundus uteri has been observed not to have ascended higher than the umbilicus, at the end of pregnancy.

The form of the womb changes during pregnancy. During the first three months, it retains its triangular shape, (see *plate 4, fig. 1*;) but it then becomes spheroid, elongated, and at the end of the sixth month it is ovoid, and from this period, the cervix or neck begins to develop, it becomes softer, and entirely or nearly effaced at the end of pregnancy. The best mode of ascertaining the ascent of the womb is, by placing the woman on the back, the soles of the feet being on the bed or couch, and the hand of the obstetrician being placed upon the abdomen. Another method is, to desire the woman to lean forward on the

edge of a table or back of a chair, so as to relax the abdominal muscles, when the size of the womb may be readily ascertained, unless the abdomen is prominent from fat, which is often the case. If we fail by these methods, the woman should be in bed and an abdominal and vaginal examination made simultaneously in the manner hereafter described.

The direction of the womb varies during pregnancy, but in natural cases, it ascends on the mesial or central line, from the pubis towards the umbilicus or navel. It generally follows the directions of the axes of the superior strait or entrance of the true pelvis, (see *plate 2, fig. 1, e e, f f, g g,*) but the organ is more frequently inclined forward, and to the right or left side, or behind this axis, constituting obliquities.

The anterior direction is the most frequent, and is distinguished by the prominence of the abdomen in front, and by the presence of the neck of the uterus behind. It must be manifest to all educated medical practitioners, that as the fundus and body of the womb press the abdomen forward, the cervix and orifice must be placed posteriorly, (see *plate 13, fig. 1.*)

The causes of this direction or obliquity are, flaccidity of the parietes or walls of the abdomen, the inclination of the pelvis forwards, and the excurvation or internal projection of the lumbar vertebra, or lower part of the spine. I may here observe practically, that in such cases the recumbent or lying posture in bed or on a sofa, with a bandage round the abdomen, will afford considerable relief. The use of stays and certain abdominal bandages are also beneficial.

When there is obliquity of the uterus on the right side, there will be prominence of the organ in the same direction, and its neck will necessarily be to the left. The causes are distention of the rectum and left iliac colon, with the accumulation of the small intestines on the same side, which press the womb to the right side.

The obliquity on the left side is comparatively rare, and its causes are not so easily determined. The prominence of the abdomen is on the left side, and the uterine neck and orifice are on the right.

The obliquity occurs posteriorly when the parietes of the abdomen offer such strong resistance as to force the womb to ascend parallel to the spine, that is, behind the axis of the superior aperture of the brim of the pelvis. (see *plate 2, fig. 1, e e.*) In such cases the abdomen is flat, and the neck of the womb is situated behind the pubis.

When pregnancy happens, a train of new sensations generally occurs, which greatly assists in determining its presence.

Every one acquainted with the structure of the human frame, as I have already observed, is aware of this fact. It is this nervous connection or sympathy between the womb and all other parts of the body, which readily explains the various disorders or derangements of function in remote parts, which many women suffer from during pregnancy; but it is necessary to state, that actual disease of the womb or ovary may also occasion many of them, independently of conception. I have met with many examples in my practice.

The principal signs of pregnancy are, suppression of the menses, modifications in the moral and intellectual conditions, vivacity or depression of mind, darkness of the areolæ or circles round the nipples, en-

largement of the abdomen, nausea in the morning, called morning sickness, change in the size and developement of the orifice and neck of the womb, generally perceptible by vaginal, and in some cases, by anal or rectal examination, (Velpeau,) as also of the breasts, and lastly, the motion of the foetus, called *quickening*.

It is also supposed by many, that a fecundating intercourse is generally accompanied by more vivid sensation than any ordinary one, although every experienced obstetrician meets with cases, in which pregnant women cannot refer to any particular date for their condition, and to use a popular phrase, "mistake their reckoning."

It is also well known, that sexual desire may be increased, diminished, and even abolished during pregnancy, and that very few of the inferior animals admit the male. This is in strict accordance with the wise ordinances of nature, as there cannot be a second impregnation in a few days after the first, because the inferior orifice of the womb is closed by a mucous plug externally, and internally by the membrane, termed decidua. Moreover, the act of reproduction may sometimes cause abortion or premature labour in some cases, and consequently, should be performed with gentleness, and only when nature dictates. (see article "Abortion," by Author, in *Cyclopædia of Surgery*.) Some nations refrain from it altogether, and I have also known a few instances of continence in this country; and one led to a separation between husband and wife.

Many women suffer from derangement of digestion, have disgust for ordinary food, nausea or sick stomach, especially in the morning, though it may occur at any hour of the day, vomiting, diarrhoea or constipation, (costiveness.) Some prefer one aliment, others desire substances not used as foods, as earth, chalk, acids, oranges, lemons, &c., &c. These likes and dislikes usually cease about the third or fourth month, although I have known them continue to the time of delivery.

The secretions are also deranged during pregnancy. There is a diminished secretion of bile, which accounts for the derangements of digestion of pregnant women, as well as for the costiveness and brownish or greenish spots on the skin, which are observed in some cases.

The secretion of saliva is sometimes so increased as to amount to salivation, and so also are the gastric and pancreatic fluids causing water-brash. The urine is often clear, sparing, abundant, or depositing various sediments, but no conclusive evidence of pregnancy can be adduced from the state of this secretion.

In some cases, there is a superabundance of vaginal mucus, especially towards the middle or termination of pregnancy, which inundates the lower extremities. The alleged bluish colour of the external orifice of the vagina is by no means to be depended upon as a positive sign of pregnancy, and may be absent when the latter is present.

The mammæ or breasts gradually enlarge in size, as do the nipples during pregnancy (see *plates 9, 10*,) become more sensitive than in the absence of this condition; the areolæ or circles round the nipples, often, but certainly not in all cases, become darker; and there may be a thin watery or serous secretion from the nipples during pregnancy, which is, however, very often absent.

The respiration is frequently impeded, difficult, short, laborious, and oppressed, and more especially after the sixth month of pregnancy, when the gravid womb ascends into the abdomen, (see *plates 9, 10,*) and prevents the free descent of the diaphragm. This also accounts for the troublesome and convulsive cough, pains in the side and chest, as well as hæmoptysis or spitting of blood during the last months of pregnancy, and frequent palpitation of the heart, which rapidly disappear after delivery.

The circulation of the blood is more or less affected during pregnancy. The action of the heart and pulse may be frequent, full, feeble or irregular. There may also be, determination of blood to the head, chest, and abdomen, and hæmorrhage from the nose, lungs, stomach, intestinal canal, kidney, vagina, &c., &c.

It is an old observation, that blood drawn from the arm of a pregnant woman is covered with a whitish substance, technically called, the buffy coat, but this is not always present. The clot is large and more firm than in ordinary cases, but these characters are often absent.

Some women become corpulent, and others emaciated, during pregnancy.

During the early months, women are able to take exercise, but in the latter months, they generally become unweildy, and exercise or exertion is very painful or unpleasant. These facts are easily understood by the weight of the gravid uterus pressing downwards, and stretching the lumbar nerves.

It is well known, that few women in the last months of pregnancy, can bear much exercise of any kind, or much moral or physical exertion, both of which often cause premature delivery, which is highly injurious to the offspring, which will be reared with difficulty. The senses of vision, hearing, taste, smell and touch are frequently deranged during some period of pregnancy.

The pressure of the enlarged womb in the last months of pregnancy upon the stomach, liver, spleen, and intestinal tube must more or less derange digestion and the action of the bowels, and diminish the sensibility of the rectum or lowest portion of the intestinal tube, causing costiveness, piles, œdema or swelling of the inferior extremities and external genitals, as well as varices or enlargement of the veins of these parts, (see *plate 12.*)

The bladder may also be pressed upon during the last month of pregnancy, (see *plate 12,*) so that it cannot fully distend itself, and hence the necessity of its frequent evacuation.

The urethra instead of being horizontal may be placed perpendicular, a fact which should be borne in mind, whenever the passage of a catheter becomes necessary.

The vagina is very much shortened in the last month of pregnancy, in consequence of the descent of the gravid uterus.

The broad ligaments (see *plate 4, fig. 1,*) become expanded according as pregnancy advances, and at the time of delivery, are as well as the ovaries and uterine tubes, on the lateral parts of the womb.

Many of the external appearances of pregnancy may be absent, although a woman may be with child; and in a large majority of cases

no positive or conclusive evidence can ever be given without an internal or vagino-uterine examination, as well as a most mature consideration of all the ordinary signs of pregnancy, together with the numerous conditions or diseases which may simulate it.

The most certain signs of pregnancy are the following:—1. The actual motion of the foetus, which is usually felt between the fourth month and a half and the fifth month of pregnancy, although never perceived in some cases, in which the infant is supposed to be dead, but born alive: 2. The state of the orifice and neck of the womb, which are ascertained by vaginal or internal examination, and also by *ballottement* or percussion of the womb: and 3. The pulsations of the heart of the foetus, which are double the frequency of those of the mother, and according to some, the placental murmur, or bellows-sound, which corresponds in frequency to the pulse of the mother. The foetal and placental pulsations may be heard with the ear, or by means of the stethoscope applied to the abdomen; the former according to the position of the foetus, and the latter according to the situation of the adhesion of the placenta, which may be in any part of the cavity of the womb. But, according to later conclusions, a placental murmur is not to be depended on, as it may be present in the absence of pregnancy, and is ascribed by M. Bouillaud to the intermittent bellows-sound of the large arteries in the pelvis, caused by compression of the abdomen. He heard it when a large tumour compressed the great vessels in the abdomen, in a case which was mistaken for pregnancy. Mr. Cusack, of Dublin, also heard it in an enlarged thyroid gland. MM. Velpeau, Capuron, Hatin, and many other distinguished obstetricians, have failed to detect the placental murmur in pregnancy, and this has also repeatedly happened to myself.

M. Nauche has lately invented an instrument which he has named a *metroscope*, which is a curved tube, one extremity of which is applied to the womb through the vagina, and the other to the ear of the obstetrician. The ingenious inventor states positively, that by this means the pulsations in the uterus will be most frequently and distinctly heard.

But the only positive proof of pregnancy is the detection of the pulsation of the heart or arteries of the foetus, which will be 120, 140, or 160 in a minute, and double that of the mother. The double sound of the foetal heart may be compared to the tic-tac of a watch placed under a pillow on which the head rests, and the noise will be proportionate to the age of the foetus. It will be discovered in different parts of the abdomen, and at the lowest part of the womb, in which the foetus will necessarily be placed by its own gravity. It is, however, to be remembered that the double pulsation of the foetal heart, and the rapid pulsation of the arteries, cannot always be felt; but when perceptible, the foetus is alive, whether the mother feels its motions or not. This evidence would be of great value previously to the performance of the operations of craniotomy and gastro-hysterotomy, commonly called the Cæsarean section.

I have been repeatedly assured by intelligent women, that the sensation of quickening is at first a very slight flutter or motion, and that

it never occurred at the same period of different pregnancies. One lady felt no sensation of quickening in her first pregnancy until the eighteenth week; on her second, at the tenth week; on her third, at the fifth; and on her fourth, at the sixth month. Her first infant was a girl, her second and third were boys, and the fourth a girl. Again, I have been repeatedly consulted in cases in which ladies who had three or more children were alarmed during a future pregnancy at not having felt the motion of the foetus until the sixth or seventh month, and some not at all, though healthful infants were born in due time.

A few women reckon with great accuracy from the time of quickening as to the date of labour, and their delivery has only exceeded the fixed period by a day or two, though I have often known four and six weeks elapse after the expected time of parturition.

When called upon to determine the existence, progress, or non-existence of pregnancy, the medical practitioner must not only inquire into the history of all the usual signs, as hitherto enumerated, but he must likewise examine the abdomen externally, as well as the breasts, nipples, and the areolæ, or circles surrounding the latter, the progressive changes of all which parts I have delineated in plates 9, 10; and he must likewise ascertain the progressive developement of the orifice and neck of the womb, the illustrations of which will be found in *plate 11, figs. 1, 2, 3, 4, 5, 6*. The latter is called an internal examination, which is indispensably necessary in almost all cases, unless when the supposed enlargement of the abdomen can be clearly and satisfactorily ascribed to the existence of actual disease of some of the organs in the pelvis or abdomen. In the excepted cases, the usually deranged state of the general health, the regularity of the menses, the absence of the ordinary symptoms of pregnancy, and especially if the swelling did not ascend in the mesial line or centre of the abdomen, from below upwards, are proofs of the non-existence of pregnancy.

I have repeatedly given a positive opinion on such general evidence as to the absence of pregnancy, without any internal examination, and have been in most cases correct; and I need scarcely observe, that the proposal or institution of a vaginal examination in the case of an unmarried woman ought to be made with great caution and delicacy, and never before all other proofs have been unsatisfactory, suspicious, or inconclusive. This is the opinion of all respectable and experienced obstetricians.

The modest feelings of the softer sex are ever to be respected, and are never interfered with by medical practitioners in the cases under consideration, unless when the rights of justice, morality, and the preservation of health and honour imperiously demand and enforce it. I may here observe, that I have often been consulted in cases of suspected pregnancy by unmarried and married females, when such states did or did not exist, when the person was or was not unconsciously pregnant, when she was or was not in labour, as well as in alleged abortions or premature labours caused by violence, nay, even to perform the Cæsarean section on a woman supposed to be in labour, though not pregnant.

It follows from the preceding facts, that an internal, vaginal, and ute-

rine examination is indispensably necessary in almost all cases. It is made in the following manner.

Internal Vagino Uterine Examination. French. *Ballottement.* The Touch. English. *Succussion or Shaking the Fœtus in the Womb.*—The internal vaginal, and uterine examination, termed *toucher* by the French, is made by introducing one or two fingers into the vagina or passage to the womb, to examine the exact condition of the inferior orifice or mouth, neck, and surrounding part of the organ, and at the same time applying the other hand upon the abdomen above the pubis, to ascertain the exact situation of the fundus, or superior part of the womb, (see *plate 13, figs. 2, 3*).

In all cases in which a vaginal examination is required, there should be a second female in the apartment, and this rule is universally adopted by medical practitioners.

The vaginal examination enables us to determine, in most cases, with accuracy, the healthful or deformed state of the external and internal genital organs, and of the bones of the pelvis, whether sufficiently capacious, as well as the existence of all kinds of morbid growths. It also leads us to form a very accurate opinion of the existence of pregnancy, the different states of its progress and its species, whether labour pains are real or spurious, the stages of parturition, the presenting or descending part of the infant, its relative position to the pelvis or bones of the mother, if the labour be natural or preternatural, easy or difficult, whether it will be quick or slow, and whether any and what operation, manual or instrumental, may be required to save the lives of both mother and offspring, or of either. Lastly, this examination points out to us the descent or progress of the birth of the infant, and also of the separation and expulsion of the placenta or after-birth. Experience alone can qualify a physician or surgeon to distinguish between the natural state of the organs, before and during pregnancy, labour, or after delivery, and when they are inflamed, ulcerated, or otherwise diseased.

Position of the Woman.—The obstetric position usually adopted in this country is the left side, as near the edge of the bed or couch as possible, the head being bent on the chest, the thighs on the abdomen, and the legs on the thighs. This position relaxes the muscles of the abdomen, and greatly facilitates the exploration of the pelvis, and the organs which it contains, (see *plate 15, fig. 3*). The bladder and rectum should be empty previous to a vaginal examination.

The index and middle fingers of the right or left hand are to be smeared with some oleaginous substance, as lard, pomatum, fresh butter, olive oil, &c., which will facilitate their introduction, and preserve them from infection in venereal cases, or from irritation in other malignant discharges. The nails of both hands should be closely pared. Two fingers are used, as the middle being longer than the rest, necessarily penetrates more deeply. The two fingers being elongated, or straightened, the third and fourth bent on the palm, and the thumb brought on the inner surface of the third or ring finger, (see *plate 13, figs. 2, 3*). But when the object is to penetrate as deeply as possible, it is best to place the thumb on the pubis, and then we are most certain of arriving at the womb.

The hand should be brought from the knees towards the genital aperture, and the radial surface of the fingers, from the perineum towards the pubis, from below upwards to the centre of the vulva, (see *plate 4, fig. 1*), when the labia are to be separated, and the introduction effected.

In making this examination our objects are, to ascertain the state of the external and internal genital organs, the external and internal labia, the urethra, vagina, rectum, the capacity of the cavity of the pelvis, the state of the neck of the womb, and the size of the organ, by pressing with the left hand on the abdomen, and gently percussing or striking the fundus or superior part of the womb, when a motion will be felt by the fingers in the vagina, caused by the descent of the foetus, which is heavier than the fluid which surrounds it. This shock is termed *ballottement* by French authors. This movement will be rendered more distinct by pressing the womb from below upwards, and then from above downwards. It is necessary to feel it, that the womb should contain a certain quantity of amniotic fluid, and the foetus have acquired a certain weight. The shock is very perceptible between the fourth and fifth month of pregnancy. The erect position is necessary to perform ballottement, and to ascertain the exact situation, weight, mobility, and changes in the womb and its neck; and in such cases the obstetrician should kneel on one knee in front of the patient.

When she is on the left side, the operator uses the right hand, and when on the right side the left hand; and when she is on the back, the continental, and I think, the most natural position, the obstetrician places himself to the right of the bed, employs the right hand; and to the left when he uses the left hand, (see *plate 15, fig. 2*).

After having carefully examined all the parts which can be touched through the vagina, the obstetrician should apply the other hand to the abdomen, to ascertain the size, elevation, and direction of the womb; and here he must remember the progress of uterine development at the different periods, which are delineated in *plate 9, figs. 1, 2, 3, plate 10, figs. 1, 2, 3*, and now about to be described.

I have illustrated by several figures in *plates 9, 10, 11*, the development of the neck of the womb, the size of the abdomen, breasts, and nipples, at the third, sixth, and ninth months of pregnancy. *Plate 9, fig. 1*, represents a front view of the appearances of the abdomen, breasts, and nipples, at the third month of pregnancy; *fig. 2*, at the sixth, and *fig. 3*, at the ninth month. *Plate 10, figs. 1, 2, 3*, represent a lateral view of the same parts at the same periods.

Plate 11, fig. 1, represents the neck and orifice of the womb in the virgin state, but I have found it as small in women who had had children, and more especially in young widows. *Fig. 2* illustrates the neck of the womb at the third month of pregnancy, in a woman who had not an infant before; *fig. 3*, the neck of the womb at the sixth month, in a female similarly circumstanced as in *fig. 2*; *fig. 4*, the mouth of the womb at the ninth month of pregnancy, the woman not having had children before; *fig. 5*, the neck of the womb in a woman not pregnant; *fig. 6*, the neck and orifice of the womb at the ninth month of pregnancy—but in many cases it is not so prominent, and is in the state

represented in *plate 13*, when the neck is generally developed in the cavity of the uterus.

As pregnancy advances, the neck of the womb becomes developed, widened, and shortened, and more especially about the fifth or sixth month, at which time we derive the most positive information by an internal or vaginal examination. As the neck of the womb in the preceding months is not distended by the ovum, it is pressed down into the vagina, by the increased weight of the body and fundus of the organ; while at the end of the fifth month the neck begins to expand into the general cavity, ascends into the pelvis, and therefore becomes shorter and less prominent. As the cavity of the womb gradually expands or develops after the fifth month, so does the neck of the organ, as represented in the plate and figures above referred to; and at the ninth month there is little, and often no projection of the mouth or neck of the womb, the lips of the orifice being expanded over the membrane which covers the head of the foetus, (see *plate 13, l l.*) If we apply the fingers at this period, we feel the orifice sometimes with difficulty; but in most cases it is as prominent as delineated in the figures in *plate 11*.

The neck and orifice of the womb are easily felt in most cases, during the first five months of pregnancy, by desiring the woman to flex or bend her head and inferior extremities towards the abdomen, and bear down or strain, as if evacuating the bowels. But in some cases it is not easy to feel the mouth of the womb at this period; for, according as the neck shortens, the cavity enlarges and presses more forward against the anterior walls of the abdomen, (see *plates 9, 10*); the mouth of the womb is inclined backwards and upwards towards the promontory of the sacrum, (see *plate 12*), and cannot be reached in some cases by the fingers.

In cases of abortion, whether accidental or caused by criminal means, the received opinion at present is, that the embryo is alive from the moment of conception.

It is also an axiom, that a medical witness must see a foetus before he can give positive evidence that abortion has occurred; and dependence cannot be placed on a discharge of blood from the vagina, which may happen from injury or disease, when there is no pregnancy.

It is likewise important to state, that all the signs of delivery may disappear as early as the fifth day, and all the marks of female violation in three or four days, and even sooner; indeed, almost immediately in those labouring under chlorosis or leucorrhœa. The medical practitioner must remember that a gonorrhœa cannot appear the day on which a rape may have been committed; and that females, from birth till puberty, may be affected with a yellowish discharge from the vagina, which is often mistaken by the ignorant for the former disease.

Duration of Pregnancy.—It is established beyond all doubt, that pregnancy may be protracted beyond the usual period; and every obstetrician knows that women are not always delivered at the expected time. Experience has shown that the health and vigour of parents at the time of procreation, and of the mother during pregnancy, have a great influence on the development of the foetus, as well as on the period of its birth. Every intelligent father and mother must admit the force

and truth of this conclusion. It has been maintained from the time of Hippocrates to the present period. It is attested by all observant agriculturists as regard heifers, mares, swine, rabbits, &c.

MM. Tessier and Girou have frequently observed that all these animals exceed the period of delivery. Sir E. Home has recorded, that a mare covered by an ass goes eleven months, which is her usual period; and that the ass covered by the horse goes the same time, though the tenth month is the usual period. (*Phil. Trans.*, 1822.) Every one has observed in the same flower, kitchen, and fruit garden, even on the same tree, shrub, &c., that vegetables, and their different parts arrive at maturity with more or less celerity. This result entirely depends on the goodness of the seed and soil; and so also as regards the goodness, health, or disease of the animal kingdom. This universal law is evinced in the vegetable and animal kingdoms, and in every private family who have offspring. If we examine the moral and physical conditions of parents and children of the same family, we shall observe the greatest differences, in mind and body, caused by the health and moral and physical conditions of the former, at the time of renovating their species, which affect the latter, together with the gross mismanagement of infants, morally, intellectually, and physically, to the ages of puberty and even adolescence.

The computation of the duration of human pregnancy, is made by women and medical obstetricians in a very unsatisfactory manner. Some reckon from a fortnight after the last menstruation, others from the non-appearance of the succeeding periodical period (an interval of four weeks), while many consider quickening as occurring at the middle period of pregnancy, and others twenty-four weeks before the time of labour. I have already described quickening, and showed that even little reliance can be placed on it, and in some cases in which strong living infants are born at the end of ten lunar months, or forty weeks, it has not occurred at all. Some women assert that they are positive as to the exact time of conception; but most of the sex do not pretend to such great accuracy. There are, however, instances in which peculiar circumstances lead to the most accurate results. A lady of my acquaintance, aged thirty years, and on whose statement I place implicit reliance, left London on a visit, July 30th, 1837, and her periodical health had continued on the 28th, 29th, and 30th, the usual time. She returned on Monday, the 28th of August, twenty-nine days from her last period, but as her mind was much distressed on leaving and returning home, and as she had travelled within the month over five hundred miles, she was again unwell on Saturday, August 27th, exactly twenty-eight days since the last occurrence. She continued so on the 28th and 29th, three days, as usual, and on the 29th there was every probability that she might have conceived. She was delivered of a fine healthful infant, on the 28th of May following, two hundred and seventy two days from the probable time of conception, being eight days less than the usual time as supposed, two hundred and eighty days. The boy is now most healthful and vigorous. I consider this a very important case, on many accounts, but shall not comment upon it any further. The lady is the mother of seven children, and could not say on any former occasion

what might be the time of conception, but the dates already given led her to form what she thinks, as well as myself, an accurate conclusion in one instance.

The records of medicine afford examples of pregnancy at 280, 290, 300, and 310 days, in England and France, but the exact limit is not as yet determined in either kingdom. The modern writers on medical jurisprudence (or medical evidence in courts of law, and before the legislature), give accounts of cases at eleven, twelve, and sixteen months, whether lunar or calendar not stated, and only mere quotations not proved by personal or legal evidence. (See works of Beck, Gordon Smith, Paris, Ryan, Taylor, Forsyth, Montgomery, &c.)

The law of this country assigns no exact limit to the duration of human pregnancy; but that of France limits it to 300 days, or ten lunar months and five-sevenths, and allows legitimacy to be contested after this period. (Velpeau *op. jam cit.*) An infant born after this period is considered a bastard, but its legitimacy may be contested.

According to the law of Prussia, an infant born 302 days after absence or death of the husband, is considered legitimate.

The Scottish law is to affix bastardy on a child, if the father's absence have continued until six months of the birth (lunar or calendar is not stated), and an infant born after the tenth month (query, lunar or calendar) is considered a bastard.

Another question of importance is to be considered: if an infant is born prematurely before the tenth lunar or ninth calendar month and a week, is it legitimate or not—is it viable or non-viable—or can it arrive at the adult age or not?

It has repeatedly happened that a wife, at the end of seven or eight months after marriage, has brought forth an apparently full grown infant, whose legitimacy the putative father doubted or denied.

The disposition of property and title may depend upon medical evidence on this point, as in the many peerage causes noticed in the works on medical jurisprudence.

The question of superfœtation and of the procreation of twins, triplets, or quadruplets, are still involved in obscurity.

Each infant has its own membranes, in most cases, (see *plate 20, figs. 1, 2,*) but in some cases two navel cords may be connected with one placenta. It would appear, from this arrangement, that each infant was begotten simultaneously; but there are well verified cases in which the same woman brought forth a white and black, and a white and piebald infant at the same time, she having been intimate with two men of different colours in rapid succession. It is now, I believe, the general opinion, that superfœtation cannot occur unless before the mouth of the womb is closed by the decidua, or membrane which is formed to line it in a few days after conception, (*vide ante, p. 129*).

When two infants are united at the breast or back, as the Siamese brothers, and Hungarian sisters, the actual state of physiology at present is not sufficient to explain either their moral or physical development, after birth.

CHAPTER IX.

PARTURITION.—NATURAL LABOUR.

Parturition may be defined the natural expulsion, or artificial extraction, of the foetus from the womb of the mother. Hence there are two species, natural and preternatural—eutocia and dystocia. Natural labour, according to British obstetric authors, consists in the descent of the crown of the infant's head, the pelvis or bones of the mother being in a healthful state, and the process being completed from the space of one minute to twenty-four hours, by nature alone. According to foreign authors, natural labour, whether by the head, breech, knees, or feet, exists when the process is accomplished by the power of nature alone. (*Vide ante*, p. 21, plate 14, fig. 1.)

The occurrence of parturition is generally about the tenth lunar (280 days), or ninth calendar month and a week, (*vide ante* p. 165), though the uterus may expel its contents at any time after conception has happened, when the disease is termed *abortion*, and when the expulsion occurs from the sixth to the ninth month, it is termed *premature* labour. It does not occur, in some cases, until after the expiration of nine months, when it is termed *protracted* pregnancy, or labour. (*Vide ante* p. 163.)

The proximate or determining cause of labour at the end of nine months is unknown, but the exciting cause is the repeated contraction of the fibres of the uterus, diaphragm, and abdominal muscles, as well as those of the whole body; but this co-operation is not always necessary in the early stage, when there is no voluntary action, though generally muscular action is present, but towards the completion of labour, for the womb has expelled its contents, on some rare occasions, without any painful contraction, as also when animal life had been destroyed by the death of the mother.

The operation of the pains is at first to dilate the mouth of the womb, and the contractions of the uterine fibres which cause them are sufficient for this purpose, hence the woman suffers little; but when the uterine orifice is fully dilated, and the water expelled, the womb contracts forcibly upon the body; they are usually accompanied by strong expulsive efforts, and the abdominal muscles, as well as the muscles of the superior and inferior extremities and diaphragm, are called into action, when the pains become strong and bearing down, and are now succeeded by a protracted moan or groan.

The contractions of the womb are, in most cases, accompanied by pain; but there are some rare exceptions, in those cases in which the head or body of the infant is expelled without any pain, as I can positively attest in a few cases which I have met with since the publication of the last edition of this work. The contractions of the womb, or labour pains, are frequently repeated, and separate the attachment between its inner surface and the external membrane surrounding the foetus, and gradually dilate the mouth of the organ, to admit of the expulsion of the foetus and its appendages.

The repeated contractions of the fibres of the womb upon the loose blood-vessels which pass between them, so effectually diminish their size, as to prevent hæmorrhage, or loss of blood in a great majority of cases, during and after labour (see *plate 13, figs. 1, 2, 3, 4*), to dilate the mouth of the womb, to force down the body of the foetus, cause its expulsion as well as that of the placenta and membranes, and then compress the organ so efficiently as to abolish its cavity. Such is the wise operation of nature, in the complicated process of human parturition, in a preponderating majority of instances. The contractile power of the uterus and external genitals is so rapid and instantaneous, after the expulsion of the foetus and its appendages, in strictly natural labour, that the latter are generally reduced in a second to their natural size and condition. This fact renders it extremely difficult, in a few days after delivery, to determine whether a woman has or has not recently borne an infant (*vide ante, p. 163*). It often embarrasses a medical witness in alleged cases of infanticide, while it explains the wisdom of nature in reducing the organs to their unimpregnated condition, in cases of wives, widows, and others who have borne offspring.

Happily for humanity, the process of labour, in a vast majority of cases, is safe and free from danger, especially when women live according to nature's laws; but among the higher and middle, indeed all classes in civilized society in which these laws are frequently violated or forgotten, or when the constitution is impaired by the luxury or dissipation of modern times, the process of child-bearing is attended with more or less danger, both before and after it is completed. These observations are particularly applicable to the lower classes of society, whose customs, habits, pursuits, and intemperance, render them liable to many serious accidents during parturition, and to a vast number of inflammatory and febrile diseases after delivery. The universal testimony of all experienced medical practitioners, confirms the truth of this assertion. It is, however, fortunate for suffering humanity, that the process of parturition may now be greatly accelerated, and the greatest of mortal suffering relieved by the advice and skilful exertions of the obstetrician or medical attendant, and with the most perfect safety to the parent and offspring. It is well known that even the presence of a medical practitioner will often afford relief, and hasten delivery without the performance of any manual operation whatever. The confident assurance to the patient of her safety, inspires that balmy hope, which will hasten parturition much better than any other means. It is on this account, that there are few intelligent women who do not prefer medical attendance during labour, to that of midwives. This is the case in every civilized country, as women are well aware of the superior knowledge which medical practitioners possess of their constitutions; and hence, in modern times, we observe a wise and judicious preference given to male obstetricians, and midwives are scarcely ever exclusively employed, unless among the ignorant or lower classes, who are unable to employ the former, but even this want is now supplied by our public charities.

Fruitless attempts have been made, from time to time, to calumniate medical practitioners, and to deter husbands from allowing such indivi-

duals to afford aid at the fearful and painful period of parturition. Such attempts were as wicked as fruitless, for every husband, and every man of common understanding well know, that passion and pain seldom co-exist, and that the awful responsibility of the medical attendant at the nativity of the human species, as well as his moral, social, and domestic obligations, obliterate every improper sentiment, impress his mind with the duties he owes to his Creator and his neighbour, and excite fear, pity, and humanity, towards his fellow-creatures, instead of any other emotion. He, too, most likely, is a husband, a father, and citizen; his professional reputation is always at stake in such cases; and his mind is solely influenced by the wisdom of Providence in all cases, natural or preternatural, and he is always most anxious for the preservation of the lives of two of his fellow-creatures, as well as for the maintenance of the rights of justice, humanity, and religion. It is a most unfounded libel to suspect him of unworthy motives—it is utterly false, and the idea of abandoned, profligate, wretched libertines or debauchees—it is not tolerated by society, and is as contrary to reason and common sense, as it is to justice and religion. Were the unfounded accusation or insinuation ever true, the annals of our different courts of justice would afford some solitary illustration, which is not the fact.

I have never known a single instance of a woman in any rank of life, who had been attended in labour by an educated, not an ignorant or pretended, medical practitioner, who would ever after submit to the care of a nurse or midwife.

What, I beg to ask, does an ignorant midwife or nurse know concerning the mechanism of human nativity, or the difficulties that attend it? I answer, about as much as an unborn babe. Is not the mortality of infants immense among all classes, unattended by medical faculty? No medical practitioner, duly educated, can deny this melancholy fact. In fine, I venture to assert, that were it practicable or prudent to address a public assembly composed of all ranks of society, I would undertake to prove, and demonstrate to the conviction of every rational individual present, the propriety, superiority, and humanity of preferring medical to other aid during the process of human parturition.

I shall now subjoin a concise account of the duties of the male or female obstetrician, during natural parturition; the cares necessary in the puerperal state or after delivery; and the management of the newly-born infant, with rules for its physical education.

The reader will find a summary of the following remarks in another work of mine, *Obstetric Aphorisms*, and *Medico-Chirurgical Pharmacopœia*, 1838:—

Every medical obstetrician should have, in a small pocket case, for common use, a female catheter, a tracheal pipe, a lancet, some morphia or opium, ergota, and a pair of scissors.

He should also have a complete set of obstetric instruments, in a leather case, consisting of a forceps, lever, blunt-hook, perforator, craniotomy forceps, crotchet, and an osteotome, which he should take with him; but these should never be used until absolutely required. (See plate 40, for instruments, and plates 30, 31, 32, 33, 34.)

The morphia, or opium, will be necessary to subdue false or useless pains, and to allay excessive irritability, and is always necessary after delivery, to induce tranquillity and rest.

The female catheter may be required to evacuate the bladder in some cases, during labour, and before delivery.

The tracheal pipe enables the practitioner to inflate the lungs, when the infant is still-born, though he may dispense with it and employ other means, as blowing into the lungs, warm bath, &c. (See *Resuscitation of newly-born Infants*.)

Blood-letting may be necessary when the woman is young, robust, plethoric, and when the external genitals are rigid, as in most persons at a very early age, or beyond the age of thirty years, in first confinements. No medical practitioner can properly be without a lancet.

The ergota will be required when labour pains are inefficient, and the pelvis and presentation are natural, (see *plate 2, fig. 1*). It should never be administered unless by a medical practitioner. It is a most valuable, but dangerous medicine, when improperly administered. (*Vide postea*.)

The scissors will be necessary to divide the navel-cord, and sometimes the band which binds down the tongue, when the organ is said to be tied, and the infant cannot lay hold of the nipples.

When requested to attend a parturient woman, the obstetrician should visit her as soon as possible.

He should be distinguished for suavity of manners, politeness, delicacy, humanity, sympathy, patience, and never evince anger under any circumstance. He ought to possess perfect self-command and confidence, which are the characteristics of a duly educated and experienced medical obstetrician.

First Inquiries.—On his arrival at the patient's residence, he should, if a stranger to her, make all delicate inquiries from the midwife or other female attendant, before he sees his patient. He may see her at once if already known to her.

He is to ascertain the history and progress of the case, including the age of the patient; the period of the pregnancy, whether terminated or not; whether it is a first or future labour; the state of the bowels and bladder, whether lately evacuated or not; the description of the labour pains, whether regular, gradually increasing, propulsive, or slight and inefficient, and, if the patient has been already a mother, the character of her former parturitions.

Precursory Signs of Parturition.—When a woman has arrived at the completion of pregnancy, has had a sense of weight in the lower part of the abdomen for a day, or two, or more, with pains in the loins, a frequent desire to evacuate the bladder or bowels, and a glairy mucous discharge from the vagina, popularly called “shows;” the bowels regular, and the labour pains recurring, at first every hour, then half-hour, then every twenty-five, twenty, fifteen, ten, or five minutes, and finally, every minute, or doubling upon each other, and becoming stronger and more propulsive on each return; the function of parturition is about to be performed, and the sooner the obstetrician can see

his patient the better, as it is most essential to institute an internal examination of her actual condition, as soon as possible.

The nurse, or some female friend, should announce the arrival of the obstetrician, if a stranger to the woman, and after as short a time as possible, obtain an interview for him with his patient.

On entering the patient's chamber, he should express sympathy for her condition, in all cases, and inspire her with confidence as to a favourable termination of her delivery; and assure her that, from all he has heard from the female attendant, it is certain, or most probable, she shall do well.

This assurance may be given in all cases, as it consoles the timid and suffering woman, and it is easy in bad labours to say, after some time, that things have taken an unfavourable turn, and that further advice or assistance is necessary. The arrival of a medical practitioner has often the effect on timid women, of suspending the labour pains.

He is next to take a seat near the bed, enter into conversation with the patient and nurse, learn the history of the case, and observe the external appearance of the abdomen; examine the pulse and tongue.

As soon as the first or second pain has ceased, he may place his hand over the bed or ordinary clothing, on the abdomen, so as to ascertain whether it possesses the appearance and solidity as in the last month of pregnancy, (see *plate 12*).

This external examination is necessary, for labour has often been supposed to have commenced, when there was no pregnancy. I have been called to many such cases, and even to perform the Cæsarian operation, when there was no pregnancy.

An internal examination alone can enable the obstetrician to conclude positively whether the woman be really in labour or not; whether the labour will be natural or preternatural, and whether she be likely to be speedily or slowly delivered.

Proposing Internal Examination.—The importance of this examination should be dwelt upon by the nurse, female friend, and medical practitioner, in the presence or hearing of the patient, and it ought to be proposed and made as soon as possible.

It is popularly termed, “taking a pain,” and by the French, “the touch;” but it can as well be made in the absence of a labour pain, (see *plate 13*).

Many women strongly object to a vaginal examination in the first stage of labour, when there are slight pains, and will not allow it; but we generally succeed in obtaining permission to make it, by not betraying the slightest consciousness of its being in any degree indelicate. If we act in this manner, and ask the nurse for a napkin and some pomatum, the object of which is well understood by her and the patient, more especially if already a mother, no objection will be made to our proposal, though it is often refused by women who have had several children; and the obstetrician is most unreasonably compelled to sit up a whole night, before he will be allowed to ascertain whether the woman is in labour, and whether the labour is natural or preternatural. Such conduct is really indefensible, and results more from assumed than real

modesty, in women who have been examined and assisted during many former parturitions. But when the labour pains become severe, there is seldom any objection made to this examination.

The obstetric position is the left or right side, or the back, the left side being generally preferred by British obstetricians, as it enables the practitioner to use the right hand (see *plate 13, 14*), but delivery is as safely accomplished on the back (see *plate 11, fig. 2*), which is the European position, preferred by American, and East and West Indian medical practitioners; and, in my opinion, it is the best, for it is to be borne in mind that women in all countries have been delivered in the erect, sitting posture, on the knees, and as I have once observed, the patient leaning on the bed with her body bent. Too much stress has been laid, in this empire, on the necessity of the woman being laid on the left side, and I have repeatedly known this position to be kept for two, three, and even four, days and nights, regardless of the violation of physiology, and of the urgent entreaties of the unfortunate sufferer to be allowed, during a pain or two, to turn on the right side or back. But it must be manifest to any educated member of the medical profession, nay, even to any one endowed with common sense, that it is a matter of little, if any importance, how a woman in labour may be placed until the infant's head is passing through the external genital aperture, (see *plate 15*).

I shall offer other strictures on the unjustly preferred position on the left side, when describing obstetric operations hereafter.

The patient should lie on her left or right side, on a bed or couch, the knees being bent and raised towards the abdomen, and the bosom depressed towards the knees, the hips placed near the edge of the bed or couch, and a counterpane or coverlet thrown over her.

The nurse, or some other female, ought to be in the apartment during the examination, the bed curtains closed, and light partially excluded.

The obstetrician is to sit on a chair, close to the hips of the patient.

He places a napkin on his knees, another near him, and after turning back both sleeves of his coat, desires the nurse to pin another napkin round each arm. This may be dispensed with at first, but is convenient during the progress of labour. He then removes his ring, if he wear one, and places it in safety, as it is sometimes lost, and the source of annoyance to the patient and her nurse.

He next lubricates the index and middle finger of the left or right hand, according as the position of the bed may require, with pomatum, lard, fresh butter, or olive oil, which the female attendant has usually in readiness for him, the nails of these fingers having been previously cut closely.

Vaginal Examination.—All these preliminaries being attended to, as soon as the next labour pain returns, he passes the hand from the knees along the thighs, to the external genital aperture, separates the labia pudendi, introduces the two lubricated fingers into the vagina, and directs them downwards and backwards towards the sacrum, or lowest bone of the back, within an inch of which will usually be found the os uteri, or orifice of the womb, in a majority of cases, (see *plate 13, figs. 2, 3*).

The uterine orifice is pushed down into the pelvis, and contracted during the labour pain, and at the commencement of parturition, is about the size of the disc of a sixpence, (see *plate 13, fig. 2*). As soon as the pain ceases, the orifice dilates to the size of a shilling, or larger, and the vaginal mucus is increased. The fingers should now be passed round the inferior part of the uterus, so as to ascertain the presenting part of the infant, which can be often accomplished even at this early period; next over the internal surface of the bones of the pelvis, to determine whether they afford sufficient space for the birth of the infant (see *plate 2, fig. 1*), or whether there are any solid tumours which narrow the vaginal passage, or whether this last part is dry or lubricated. When all these points are ascertained, the fingers are to be withdrawn from the vagina, and wiped under the bed clothes with the napkin, previously placed on the knees, or set aside for that purpose.

This examination enables the obstetric practitioner to determine, whether the woman is or is not in labour—that the labour is natural or preternatural—that it will be quick or slow—that the cavity of the pelvis is natural, capacious, or contracted, and in most cases, whether any manual or instrumental operation will be necessary.

An early vaginal examination is indispensable, as it may save the parturient woman a vast deal of useless suffering, for if the labour is preternatural, and requires an operation, this can be performed much easier in certain cases, as in version or turning, before the labour is advanced, and the patient has suffered severely for hours or days, and her strength become exhausted, her life endangered, or death imminent.

The introduction of the fingers ought to be effected as gently and speedily as possible, and with the greatest delicacy and modesty. This internal examination ought not to produce the slightest pain, if judiciously made, and it generally removes the dread which many women entertain regarding medical assistance, and also the groundless fear of the obstetrician.

The presenting part of the infant cannot always be determined by a vaginal examination at the commencement of labour, before the dilatation of the orifice or mouth of the womb. But, as a general rule, it may be laid down, that the head may be distinguished by its roundness, firmness, bulk, and sutures, (see *plate 2, figs. 2, 3*); the breech by the cleft between the thighs, the genitals, (see *plates 24, 25, 26, fig. 4*), and by the discharge of the meconium; the foot by its length, the heel, the shortness of the toes; the hand by its flatness, by the thumb, and the length of the fingers, (see *plate 21, fig. 2*); the chest, abdomen, hip, navel-cord, back, shoulders, neck, face, &c., by their peculiarities. It is, however, much easier to determine the presentation after the escape of the liquor amnii, or “water,” when the descending part is pushed much lower in the cavity of the pelvis, by the contraction of the womb, or the labour pain, the orifice being now much more dilated, (see *plate 14, fig. 1*).

Signs of Parturition.—When a pregnant woman has, for some time previous to the accession of labour, suffered from restlessness at night, and has found the uterus and abdomen subside, the sense of the weight and motion of the infant lower down in the pelvis than usual, a mucous

vaginal secretion, at first glairy, and afterwards mixed with blood, a frequent desire to evacuate the bladder and bowels, the labour pains regular, and recurring at diminished intervals, grinding and bearing down; the labia and vagina relaxed, (see *plate 13, fig. 2*), the os uteri dilated, with tension and relaxation of the membrane, (see *plate 13, fig. 3*), or the liquor amnii (water) discharged, (see *plate 14, fig. 1*); the vertex, or crown of the head, the presenting part, (see *plate 14, fig. 1*), advancing during a pain and receding afterwards, the orifice of the womb becoming more and more dilated, the bones of the maternal pelvis natural, the function of parturition is about to be performed, and the labour is natural, (see *plates 13, 14, 15, 16*).

The pains which accompany labour are termed *true* and *spurious*, or *false*. The *true* are caused by uterine contractions, and are regular in their progress, and cause the expulsion of the fœtus; the *false* have nothing to do with delivery. The real pains are recognized by the hardness of the womb, the dilatation of its neck, the tension of the membrane within its orifice, and perfect quiet which follows it, (see *plate 13, figs. 2, 3, 4*).

The *false* pains are felt in the intestinal canal, kidneys, rectum, bladder, and lower limbs, and do not affect the womb in the manner above mentioned. The false pains are very irregular in their progress, and are not followed by that perfect ease which succeeds to the real ones.

It is right to state, that true and false pains may exist at the same time, so that, to use the words of M. Capuron, "a woman may be delivered with false pains, and not by false pains," for the latter do not affect the womb, and are not those which cause delivery.

False or spurious pains are slight, short, and unpropulsive, recurring at irregular intervals, and attacking different parts of the bowels and abdomen. They generally arise from some intestinal irritation or spasm of the womb, are not bearing down, do not affect or dilate the uterine orifice, and are generally removed by opening the bowels, or by a sedative. They continue for several days, though labour has not commenced, or even when there is no pregnancy.

I have repeatedly known women who considered themselves in labour for three, five, ten, and fourteen days before the process had actually commenced; and in some nervous or hysterical cases in which there was no pregnancy.

Information for the Patient or Friends.—As soon as the vaginal examination is completed, the obstetrician ought to inform the patient and her friends, if any be present, of the kind of labour; whether it will be easy or difficult, as this enables them to procure additional advice or assistance, should they think proper, which is their undoubted right to do, not only in labour, but in all diseases; but it is not always prudent to apprise the woman of danger. She ought to be cheered and comforted in the worst cases, and her real condition only communicated in another apartment to the nurse, or her nearest friends, and finally, to herself.

A confident assurance that no operation will be necessary, and that

the woman shall do well, has the most beneficial effect, in the majority of cases, in quieting the mind and expediting delivery. It is, however, impossible to state with certainty when a labour will be over or terminated, as some women are delivered in a few seconds, and others not before the lapse of hours or days.

I may here observe, that the most experienced obstetrician cannot determine the exact time of delivery in any case; and if, at a promised hour, there is no sign of it, the woman usually becomes dejected, supposes there is something wrong, loses confidence in her medical attendant, and the labour becomes retarded.

No one but an unfeeling man would alarm or terrify a woman in labour; and such a person, if any can exist, would be, in my opinion, a disgrace to the medical profession, and a violator of the rights of humanity.

Treatment at this Period.—If the bowels are confined, a dose of castor oil, or some mild aperient, ought to be prescribed; and if griping pains be urgent or distressing, twenty or thirty drops of the solution of muriate of morphia, or liquor opii, or even common laudanum, may be given, and repeated, if necessary. The woman ought to remain quiet, and have some gruel, tea, arrow-root, tous-les-mois or Canna-root, tapioca, &c.

She may walk about until the discharge of the amniotic fluid, or breaking of the water, and after that occurrence she should be confined to bed, as delivery is suddenly accomplished, in most cases, but may not happen for hours or days—some say weeks, afterwards.

The state of the Apartment.—The dress and bedding of the patient, and the state of her chamber, ought to be attended to.

The apartment ought to be well ventilated, and no more than one or two persons allowed to remain in it. A fire ought to be excluded in summer, unless the weather is very cold, which sometimes happens, even in this climate.

The narration of frightful stories, by nurses, midwives, and medical practitioners, ought to be studiously avoided, as they generally depress the patient, and retard the progress of her labour. The strongest-minded woman is always more or less frightened about parturition, even if she had had a dozen children, and no allusion should be made to bad cases,

The bedding is arranged differently in different countries and ranks of life.

Position.—The position of women during labour varies according to the countries which they inhabit; some are placed standing, others on the side, some on the knees, and some on chairs made for the occasion. But the best position is on either side or back. In France women are delivered on a bed or mattress placed near the floor, and in this country on an ordinary bed. The head should be supported with pillows, and bent towards the knees, the hips near the edge of the bed.

Women, in general, are delivered on a mattress, with a folded sheet or blanket, and a skin of bazil or wash leather placed under the hips to absorb the moisture, and to be removed when parturition is completed. In London, the nurses turn the lower half of the bed pallet upon the the upper, and place the folded blanket and skin upon the bare mattress,

or sacken bottom of the bed. The feather or other bed is removed among the upper classes of society, and the woman is delivered on a hair mattress.

The period at which the woman should go to bed.—When the water escapes, which is generally when the mouth of the womb is fully dilated, the woman ought to be confined to bed, as delivery may be rapid or instantaneous, her body bent, the knees drawn towards the abdomen, and the feet pushed against the bed-post or foot-board during each pain; a long towel or shawl is passed round the bed-post, at the head or foot of the bed, so that the patient may pull by this during each pain, and not lay hold of the obstetrician, and prevent him from assisting her, (see *plate 15, fig. 3.*).

In cases of sudden deliveries the women have been in the erect, sitting, and kneeling positions, and sometimes on the side or back. When the abdomen is more distended on one side than on the other, the opposite one should be chosen, and when very much distended in front, the back should be preferred. When asthma or dropsy threatens suffocation, delivery must be accomplished in the erect or semi-erect position. I have met with cases requiring all the above positions in my own practice, and some were sudden in consequence of the woman not getting into bed when advised. I have repeatedly known delivery occur while an obstinate woman remained on a sofa, and would not go to bed; and again, when she rose to do so, the infant being born on the floor while the mother was in the erect position, and endeavouring to get into bed.

When the labour pain comes on, the woman ought to force or bear downwards, as if evacuating the bowels or bladder; and she should not hold in her breath, or cover her mouth with her pocket handkerchief or the bed-pillow, practices recommended by women, because the result would be flushing of the face, head-ache, impeded respiration, retarded labour, convulsions, apoplexy, &c., and sometimes even death.

The patient ought to wear her night-dress, the chemise being folded above the hips, and its place supplied by a flannel petticoat; the body being covered with a blanket or counterpane, or both, in cold weather.

A loose dress favours the free action of respiration and of the abdominal muscles; while a tight dress, or stays, impedes the breathing, and action of the abdominal muscles and diaphragm, induces flushing of the countenance, head-ache, convulsions, or apoplexy, and retards the progress of labour.

The female attendant should already have procured some white sewing thread, a pair of sharp scissors (but the modern obstetrician has this in his small case), some pomatum, lard, fresh butter, or olive oil, which are to be placed on a table. She should also provide a piece of new flannel to receive the infant, called “a receiver,” several napkins, and a broad calico or linen roller, to be applied round the abdomen of the woman, before or after delivery.

The obstetrician is to make the ligature for tying the navel-cord, and takes three or four common white sewing threads, knots them at both ends, divides them in the middle, knots the divided ends, and thus

prepares them for tying the umbilical cord or navel-string, as soon as the infant is born, and has completely respired or cried. (See *plute* 17, *fig.* 3.)

Natural Parturition.—Natural parturition, or labour, is divided into three stages.

First Stage.—The dilatation or opening of the orifice of the womb, the tension, relaxation, and rupture of the membrane or bag of waters, and the escape of the liquor amnii, or water, (see *plates*, 13, 14.)

Duties of the Obstetrician in the First Stage of Labour.—Three vaginal examinations are sufficient during the first stage of labour, and they are made to ascertain the progress of the dilatation of the orifice of the womb, and the descent of the infant's head, (see *plate* 13, *figs.* 2, 3.) This stage may be completed in a minute, but generally continues for twelve or even twenty-four hours. It is evident that the practitioner cannot afford assistance until it is completed, or in other words, until the lower orifice or mouth of the womb is dilated, the membrane burst, and the head of the infant has descended into the cavity, or low down into the pelvis, (see *plate* 13, *figs.* 2, 3.) He may therefore leave the woman for an hour or two to visit others, when the pains are slight, the uterine orifice thin and smooth like kid glove leather, when it will dilate slowly, but not when this part is thick, like a piece of muscle, as the delivery is generally rapid; and should he remain, he ought to absent himself from the apartment occasionally during this stage, to allow the patient an opportunity of evacuating the bladder and bowels, on which pressure is made by the descent of the infant's head, (see *plate* 12.)

In addition to the precursory and real signs of parturition already mentioned, the patient complains of pain in the loins, abdomen, and inferior extremities, the labour continues, and the orifice of the womb is at length sufficiently dilated; in some cases there is drowsiness, sleep, vomiting, pain in the back, cramp in one leg, which are all favourable symptoms.

The dilatation of the mouth of the womb is slower at first than towards the end of parturition, and much slower in first than in subsequent labours. When the neck is fully dilated, (see *plate* 13, *fig.* 4), the womb forms a continuous and uninterrupted canal with the vagina, and the parts are lubricated with an abundant mucosity, which is sooner or later tinged with blood. In proportion as the neck dilates, the membrane becomes depressed across the orifice, forming a bag, which enlarges as the labour advances, and acts as a wedge (see *plate* 13, *fig.* 4). The *bag of waters* is usually round and regular, and does not pass through the mouth of the womb until it is fully dilated, (see *plate* 13, *fig.* 4). Sometimes the membrane, when very loose, may elongate itself into the vagina like a piece of intestine. The bag of the waters is soft when the labour pain is absent, and recedes, as does the head within the womb, and is hard and tense during the contraction of the organ, (see *plate* 13, *fig.* 4); and when the contraction or labour pain ceases, there is an interval of tranquillity until it returns. Every pain is followed by the same series of phenomena, and by a remission of less and less duration. The mouth of the womb gradually yields by the repeated contraction and shortening of the longitudinal fibres of the body of the

organ: a portion of water and membrane is pushed downwards, and increased by each pain, until the sides of the orifice of the womb rest on the parietes of the pelvis, and thus afford room for the escape of the infant's head, (see *plates 14, 15*). When the mouth of the womb is fully dilated, the membrane is burst by the uterine contraction, the amniotic fluid escapes, popularly termed "the breaking of the waters," and the first stage of labour is completed. In some cases, the bag of the waters and head of the foetus are simultaneously engaged in the mouth of the womb, and greatly favor its dilatation. In other instances, the membrane does not burst before the expulsion of the head of the foetus externally, which it covers, and in such cases the infant is said, by nurses, to be born with *a caul*, and this is advertised in the London newspapers in our day, and sold at a high price by midwives, as it is superstitiously supposed to prevent shipwreck. It is right to state that this kind of birth may be followed by expulsion of the womb itself, great hæmorrhage, and asphyxià of the infant. But, in a vast majority of cases, the waters are expelled before the head has arrived at the outlet of the pelvis, as already mentioned. It sometimes happens that the membrane ruptures slightly in the first stage of labour, before the orifice of the womb is much dilated, the waters partially escape during each pain, and the sac may still distend itself. In most of such cases the labour is interrupted, the dilatation of the mouth goes on very slowly and with difficulty, although I have known some exceptions in which parturition was easy and natural. Lastly, the membrane may rupture one or more days before the process of labour has really commenced.

When the waters escape suddenly, before labour has really set in, as happens by falls, raising weights, &c., the orifice of the womb is not fully dilated, the head or any other presenting part of the infant is forced down against it, and causes great irritation, congestion, and inflammation of the womb, and mortification, unless the state of the womb is properly understood and treated, destroys the woman in twenty-four or forty-eight hours, and she dies undelivered, so that her infant is lost as well as herself. The proper treatment I shall describe hereafter, but enter into those particulars at present, to warn my junior readers against rupturing the membrane prematurely, which, instead of expediting, absolutely retards the progress of labour, and produces the fatal consequences which I have just detailed. I have repeatedly known such fatal results induced by the rashness of uneducated and pretended medical practitioners, as well as by ignorant midwives, of whom, I grieve to record it, a vast number as yet exist, and are allowed to practice with impunity in every part of the British dominions.

The practical precept is, that the practitioner should never rupture the membrane until the mouth of the womb was sufficiently dilated to admit the passage of the infant's head, which will be after many labour pains, unless when the membrane is so thick and strong as to retard labour pains in delicate women, by retaining the waters, and their preventing the contraction of the womb on the foetus. But, as a general rule, premature rupture of the membrane ought to be avoided in all natural cases.

But when the mouth of the womb is fully dilated, and sufficient to admit the birth of the infant, and the membrane resists the uterine contractions or labour pains, it is necessary to rupture it to facilitate the escape of the infant, as well as the placenta and membrane. This practice is also required when the womb is very much distended with the waters (hydramnios), and the abdominal muscles relaxed, so as to prevent its exertion or failure of action, and likewise in transverse presentations, to more readily perform the operation of version or turning, (see Version.)

When it is necessary to rupture the membrane, which is very seldom the case, it should be done during a uterine contraction, or labour pain, by introducing the index or middle finger into the vagina, and pressing it against the distended pouch or sac; and if this is not effectual, the membrane may be scratched with the nail of the finger, or some sharp pointed substance, such as a newly-made writing pen, or a sharp-pointed piece of wood.

When the sac is flaccid during the pain, it may be pinched with the index and middle fingers, or with these and the thumb, and thus ruptured.

In many cases the position of the foetus can be ascertained previously to rupturing the membranes; and if the presentation be preternatural, it should be rectified before the escape of the waters by the operation of version or turning, described hereafter.

During the progress of the first stage of labour until the escape of the waters, women are often irritable, restless, impatient, and despondent; they cannot remain in a certain position for any time, or they suffer from thirst, nausea, vomiting, and in some rare cases, from fever.

This first stage of labour may continue from the space of one instant to six hours, but the escape of the waters may not be followed by the expulsion or birth of the infant for one or more days afterwards, though, in most cases the latter may rapidly succeed the former.

Expulsion of the Foetus.—When the membrane has ruptured, and the waters have escaped, the womb now closely contracts on the body of the infant, which is expelled through the pelvis in the manner already described, (*vide ante*, p. 25.)

When the head and body of the infant are coming into the world, (see *plates* 14, 15, 16), there is often a great disturbance of the whole functions, the pulse becomes strong and frequent, the respiration hurried or laborious; there is sometimes vomiting, at other times sudden action of the bowels; the temperature of the body is increased; the skin becomes covered with perspiration; the countenance is animated, and more or less florid; there is a tendency to sleep in some cases, or pain in the head, delirium, or convulsions. But all these symptoms occur instantaneously, or may be entirely absent in many cases.

The woman may walk about her chamber, or recline on a bed or sofa, until the rupture of the membrane and escape of the waters, as the womb is not fully dilated before this occurrence, and the infant cannot possibly be born; but after it has happened, the infant's head descends

low in the cavity of the pelvis, and the patient ought to go to bed, as the delivery may be instantaneous.

In fine the chief duties of an obstetrician are to attend as soon as possible and next to ascertain, 1, Is the woman pregnant? for it has often happened that pregnancy, and even labour, have been supposed to exist when absent, (*See Signs of Pregnancy, p. 150.*) 2, Supposing there is pregnancy, has it arrived at the full time? 3, Is labour present, or are the pains false or spurious? 4, Is the pelvis well formed, and sufficiently capacious? 5, Is the womb properly situated? 6, Are the genital organs rigid, or favourably disposed for dilatation, or the passage of the foetus? 7, and lastly, is the latter small or large, and properly situated? or is it disproportioned to the size of the pelvis? for when the infant is large and the pelvis small, the labour will be slow and difficult. When labour is about to commence, attention to diet, regimen, dress, and posture, are necessary to facilitate delivery.

During the first stage of labour, the diet ought to consist of farinaceous aliment, as gruel, arrow-root, sago, canna-root, Irish moss, &c., but no wine or spirit, unless the health is bad, or the labour tedious, when either may be given, according to the wish of the patient, in small quantity, and as medicine. It is, however, to be recollected that the inferior animals take no stimulants during their deliveries, which are generally safe.

When the labour pains are slight and teasing, or are spurious, a dose of morphia, sedative liquor of opium, which is preferable to laudanum, or solid opium, will relieve them, and procure sleep, after which strong labour pains generally occur.

Frequent vaginal examinations are injurious; they excite irritation, and often convert a natural into a tedious or difficult labour. It is an excellent axiom that "a meddlesome midwifery is bad." No attempt should ever be made to dilate the orifice of the womb, the vagina, or external genital aperture, in ordinary cases of labour; *arte non vi*, science not force, leave nature to herself.

When the first stage of labour is slow, the patient young and plethoric, and the soft parts rigid, or when she is over thirty years of age, venesection from a free orifice to the approach of fainting, together with warm fomentations, is the best means of inducing relaxation of the genital organs, as well as their dilatation.

When the patient is delicate, nervous, or hysterical, a full sedative draught, or a starch and opiate clyster, is the best remedy to suspend useless pains, procure rest, and afterwards the dilatation of the womb. *R. Mucilag. amyli, ℥ijj., sol. morph. mur., m xx. xxv. xxx. Fiat enema.* In these cases, wine or spirit and water may be administered in moderate quantity.

Second Stage.—The descent of the vertex or crown of the infant's head, the dilatation of the external genital aperture, the expulsion or birth of the infant, and its separation from the parent, after placing the ligature or tying of the umbilical cord, (see *plates 14, 15, 16, 17*).

Duties of the Obstetrician in the Second Stage of Labour.—*Descent of the Infant's Head.*—As soon as the waters escape, the labour pains,

become severe and bearing down, in consequence of the bones of the infant's head being now pressed against the soft parts (womb, vagina, or perineum of the mother), the woman usually draws in her breath, bears down forcibly, and exerts the diaphragm, the muscles of the abdomen, thorax, and extremities.

The presentation of the infant's head in natural parturition is the vertex or crown, the face is at first turned obliquely or to the back part of the hip, (see *plate 14, fig. 1*; *plate 16, fig. 1*); the occiput is opposite to the acetabulum, or lower and thick part of the hip, and the chin rests on the chest. The forehead is turned to the sacro-iliac symphysis, and the occiput to the opposite acetabulum (cotyloid foramen), or socket of the thigh bone, and the head is in an oblique direction relative to the brim or upper entrance of the maternal pelvis, (see *plate 14, fig. 1*); then it descends low into the cavity of the pelvis, (see *plate 14, fig. 2*.) and it turns so that the face finally arrives in the concavity of the sacrum, and the occiput comes under the pubis, (see *plate 14, fig. 3*.)

No more than three vaginal examinations are to be made during the descent of the head, to ascertain its progress, which can be effected by nature only; and the fingers ought to be lubricated before each examination, as already described; unless there be a copious secretion of vaginal mucus. Frequent examinations cause irritation, predispose to inflammation, and very generally convert a natural into a tedious or difficult labour. When the patient complains of severe pain in the small of the back, it may be relieved by strong pressure made with the palm of the nurse's hand over the affected part.

The pressure of the head when descending into the pelvis on the lumbar and sacral nerves causes cramp in the thigh or leg, which in general will be speedily abated or relieved by tying a handkerchief tightly above the knee of the affected limb. This pain or cramp is a favourable sign of the natural progress of labour, or descent of the infantine head.

The woman may during this period lie on either side, or on the back, until the head presses on the external parts, when the left side is preferred, as the obstetrician can generally use the right hand with most dexterity in rendering assistance.

It is unnecessary to confine the woman to the left side during the twelve or twenty-four hours occupied by the first stage of labour, viz., during the dilatation of the uterine orifice, and escape of the water, and she may bear her pains in any position she pleases, until the head is about to protrude through the external genital aperture, (see *plate 15, fig. 3*.)

When the head has arrived so low in the pelvis, as to press on the external parts, these will sooner or later dilate, according to their natural rigidity, their dilatability, the force and frequency of the pains, and the number of infants the woman has already borne, (see *plate 15, figs. 1, 2, 3*).

The dilatation is generally slow in very young or aged persons, or after the age of thirty or thirty-five years, and more especially in first

labours, in which there is usually great suffering, and the long continued pressure very often destroys the infant.

When the head comes in contact with the soft parts it is pressed against them during each pain, and gradually dilates them; and when the pain ceases the head recedes into the pelvis. Sooner or later the perineum or the soft parts between the genital fissure and anus, become distended by the head, and this is termed "the perineal tumour," (see *plate 15, fig. 1*), and then the obstetrician should support it lest it be torn with his naked hand (Hamilton), or covered with a napkin (Denman) and press it strongly towards the pubis or abdomen of the mother, (see *plate 15, figs. 2, 3*), as the pressure on the head, during natural labour, is directed from below upwards in this direction, (see *plate 2, fig. 1*.)

The hand should be applied across the genital aperture in such a manner that the head of the foetus will have support on the radial surface of the index finger, (see *plate 15*), which should press it towards the pubis, while the fingers of the other hand should be pressed on the forehead, cheek-bones on the sides of the nose or chin, when passing over the coccyx or perineum, from below upwards, (*Vide ante p. 12; plate 2, fig. 1, plate 16, fig. 1*.) During this operation the practitioner should assume the erect position. He should now examine the neck, and ascertain if the navel cord be twisted round it. In such case, he should loosen it, (see *Funis*). The finger may also be passed into the mouth to remove mucosity, and facilitate respiration. The perineum may be torn from below upwards near the anus, or at the inferior commissure, (see *plate 4, fig. 1*), or in the centre, forming what is termed, "the circular perforation." (*See Laceration of the Perineum.*)

Many modern obstetricians consider supporting the perineum not only useless but injurious, but the contrary is the more general and correct opinion. At this period there is considerable pressure on the rectum and bladder, (see *plate 15, fig. 1*); the woman expresses a strong desire to evacuate them, but there is no real necessity, and she ought not to rise from her bed, as the infant may be suddenly born, (see also *plate 12*.)

The pains now become severe; there may be shiverings, vomiting, and cramp in either lower limb, and these are to be relieved by warm drinks, a small quantity of wine or spirit and water; additional bed clothes, and tight pressure above the knee of the affected extremity by means of a handkerchief tightly applied, or the hand of the obstetrician.

The sense of bearing down at length becomes great, and often induces irritable nervous women to make strong expulsive efforts in the absence of real labour pain, which force down the head into a passage not as yet sufficiently dilated to receive it, retard labour, or lacerate the soft parts, and cause a most loathsome and distressing disease, (see *Laceration of the Perineum.*) In such cases, the obstetrician must be most attentive to the support of the perineum, (see *plate 15, figs. 1, 2, 3*), and strongly advise the patient to allow labour pains alone to expel the infant. Again, when the infant is expelled by artificial forcing, there will be danger of the irregular contraction of the womb, obstetrically

termed "hour-glass contraction;" which may likewise be caused by pulling the navel cord, retention of the placenta, necessity of forcibly passing the entire hand and arm into the uterus, to extract the latter, and great danger of hemorrhage, (see *plate 18, fig. 1.*)

These accidents may be also induced by the male or female obstetrician rapidly extracting the body after the expulsion of the head, in the absence of labour pain. So far from the patient bearing down, when there is no pain, or the obstetrician extracting the body after the birth of the head, the woman should remain quiet, and the medical practitioner or midwife, press on the neck of the infant with one hand, and on the abdomen of the mother with the other, to prevent the descent of the shoulders, and to excite proper labour pain, or pressure should be made on the uterus by rubbing the abdomen and pushing the body and limbs of the infant against it. In some cases there are pains which do not expel the infant, in consequence of the navel cord being twisted round the neck, and in such cases, the latter is to be loosened and passed over the head, if possible; and in some others it must be tied and incised as after delivery, as will be described hereafter.

When real labour pains return immediately after the passage of the head, the one which expels the body of the infant, may also expel the placenta or after birth, and membranes. In a perfectly natural labour, the pain or uterine contraction which expels the head, is rapidly succeeded by another, which expels the shoulders and body of the infant, and by another which throws off the secundines, and terminates the function of parturition, (see *plates 16, 17.*)

When the shoulders are being passed, the one is turned by nature towards the abdomen of the mother, the other to the back, and presses on the perineum, (see *plate 16, fig. 2*); and this part ought to be supported in the same manner as when the head was expanding it, as already stated, while, at the same time, the head, neck, and lower shoulder should be raised towards the maternal abdomen, (see *plate 16, figs. 1, 2,*) that is, in that curved line from below upwards, in which the head passes in natural parturition, (see *plate 2, fig. 1, plate 16, fig. 1.*) If the shoulders be too long delayed, the index finger of one or both hands may be passed under the arms, or the blunt hook may be passed under the upper arm, and traction made towards the abdomen of the mother.

As soon as the shoulders are extricated, the body of the infant ought to be turned obliquely, as regards the external genital fissure, as this position will turn one infantine hip towards the sacro-iliac symphysis, and the other towards the opposite acetabulum in the long diameter of the brim of the pelvis, (see *plate 17, fig. 1.*) The infantine hips now rapidly descend into the cavity and outlet, and one is turned towards the abdomen, and the other to the back of the mother, or in the long diameter of the outlet of the pelvis, and during the pain, the body and lower hip ought to be raised towards the abdomen of the mother, (see *plate 17, figs. 1, 2.*) The hips of the infant speedily pass through the genital fissure, the limbs follow, and the head being elevated, the infant ought to be placed in the sitting posture, its face turned from the genital

aperture of the mother, as there is often a gush of water or blood from the womb that might suffocate the infant, when it begins to respire, (see *plate 17. fig. 3.*)

As soon as the infant is born, the obstetrician should place his hand upon the maternal abdomen, to ascertain whether there is contraction of the uterus, which, if present, the organ will resemble the size of an infant's head below and beneath the navel, and also to detect the presence or absence of a second infant.

This uterine tumour existing after natural labour, is a proof that the womb has properly contracted, and there is no danger of hemorrhage, and no second infant in the organ.

As the woman is a good deal exhausted during the birth of the infant, she may have some warm drink and a table-spoonful or two of wine or spirit and warm water, according to her preference and rank in life.

Separation of the Infant from the Mother.—As soon as the infant is born, and fully respire, the circulation in the funis umbilicalis, or navel string, is no longer necessary to its existence, and speedily ceases. One of the short thread ligatures already prepared is to be applied round the navel cord, within two inches and a half of the infantine abdomen, and tied firmly, first with a single and next with a double knot, and the ends of it cut off closely. The second ligature is then placed on the navel cord, two inches nearer to the mother, with a single knot, and the navel string is cut close across to the first one, with a pair of sharp scissors, or any other cutting instrument, and the infant is given to the midwife or other careful attendant, who envelopes it in a piece of new warm flannel, called a receiver, (see *plate 17, fig. 3.*) The nurse sometimes puts on a flannel cap, which is unnecessary unless in cold weather.

The French cut the navel cord first about four inches from the abdomen of the infant, and then tie it; and they are opposed to the application of the second ligature nearer the mother. In some cases, as when the cord is infiltrated, the ligature must be drawn very tightly, so as to press out the serosity; and in others, when the infantine head is congested and swollen, the cord should be divided and allowed to bleed four, six, or more teaspoonsful, as apoplexy is present; and as soon as relief is afforded, it should be tied in the manner already mentioned.

It sometimes happens that a portion of the intestines descends into the navel cord, which should be pressed into the abdomen before the cord is tied.

In ten, or generally in twenty-five minutes, or sooner or later, after the birth of the infant, the labour pains return and expel the placenta; these are called *after-pains*. Three vaginal examinations may be made during this stage, to ascertain the descent of the placenta.

When the infant is separated from the mother, a warm napkin is folded and applied to the external genital aperture. This completes the second stage of parturition, or birth of the infant.

Third Stage.—The expulsion of the placenta or after birth, with the membranes, is termed the third stage of labour, (see *plates 18, 19, 20.*)

especially as soon as the after-pains commence and continue. The remainder of the navel cord which is protruded through the external genital fissure is to be twisted round two fingers of the left hand, (see *plate 18, fig. 1*), and the cord put upon the stretch, and two fingers of the right passed along it into the vagina, (see *plate 18, fig. 2*), and if the root or insertion of it in the placenta can be felt, the placenta is separated from the womb and lodged in the vagina.

The woman should now cough, bear down, “blow on the back of her hand,” or sneeze, by taking snuff, or take some warm tea or other fluid, and the placenta will generally be expelled; but should this not happen, the practitioner should seize its edge with two fingers of the right hand, and draw it through the centre of the vagina towards the abdomen of the woman, that is, in the axis of the outlet of the pelvis. (See *plate 2, fig. 1, gg.*)

The placenta ought to be twisted round when passing through the external genital aperture, so as to extract the membrane attached to its circumference, which contained the infant; and this ought to be drawn down between the finger and thumb, when it will feel like a piece of fresh intestine. Unless this last precaution be adopted, great alarm will be often excited on the passage of portions or shreds of membrane after the practitioner has retired.

When the pains do not recur in half an hour or an hour after the birth of the infant, gentle friction ought to be made on the lower part of the abdomen, over the uterus, for the purpose of exciting contraction of the organ; the patient is to bear down, cough, laugh, &c.

The patient or midwife ought never forcibly pull the navel-string to extract the after-birth, which might invert the womb; it will generally escape, after some time, externally, on the woman bearing down, as if evacuating the bowels.

Two cases are recorded in the *New York Journal of Medicine and Surgery*, July, 1839, one of which occurred in the preceding April, in which an ignorant druggist was called to remove the placenta; he pulled forcibly by the umbilical cord, inverted the womb, removed the after-birth, and then forcibly tore away the womb, the woman exclaiming, he was tearing her to pieces. An educated physician was called, and he arrived in time to ascertain that the womb was torn from its situation, and to witness the woman's death.

A most singular case is recorded by Mr. Cooke, which happened in 1836. A midwife was called, and found something between the limbs of a woman after delivery, who had been straining while evacuating the bladder or bowels. On the midwife touching the protrusion, it separated, and was found to be the uterus. The woman recovered. Mr. Cooke published an account and drawing of the case, with which he very politely favoured me. In this case I should be disposed to conclude, that the womb was forced externally, and separated by the straining soon after delivery, and also by the pressure of the intestines, which must have got into the cavity of the pelvis, as I have observed in two cases of rupture of the uterus. These cases clearly show the impropriety and danger of forcibly pulling the umbilical cord after delivery, for the purpose of bringing down the after-birth.

When the placenta has passed spontaneously, or is removed from the vagina, it ought to be placed on a napkin, in a basin, or other vessel, and both its surfaces examined, so as to ascertain if the whole of it has been expelled, (see *plate 19, figs. 1, 2*).

It is then to be deposited in a basin or chamber utensil, and the woman ought to have some warm wine, or spirit and water; all clots of blood removed, the vagina examined, the genital aperture closed with the fingers, and a warm napkin applied.

The parturition is now completed.

As soon as the woman is recovered from the shock of delivery, mostly in a few minutes, the wet cloths and skin of leather are to be removed from under her hips, a warm napkin applied to the genital fissure, the woman made comfortable, and additional bed-clothes put on if she feels chilliness. A broad long bandage, or binder, ought to be applied round the abdomen, and brought successively between and round the limbs, so as to press constantly upon the abdomen and womb.

This binder is used during all the stages of labour by some obstetricians, and gradually tightened during the pains, but most women do well without it, and I consider it in general unnecessary.

But the binder is sometimes used when the woman is delicate, or the womb or abdomen inordinately distended, as in such cases there is danger of fainting after delivery, as in cases of tapping for abdominal dropsy.

An anodyne draught, or an opiate ought to be administered after the expulsion of the placenta, or when the after pains become troublesome.

The bed ought not to be adjusted for an hour after delivery, or the woman put to bed, as midwives term it; and she should on no account sit up while it is being done. She may be moved on one side of the bed while the other is arranged, or she may be raised by women in a sheet, and pushed on a sofa, in a horizontal or lying position, or on chairs in the humble ranks of life, covered with a blanket. If she sits up while the bed is being made, immediately after her delivery, fainting, flooding, or falling down of the womb may be induced.

The bed should be rather hard than soft, and the woman may lie in any position she pleases after delivery, but the shoulders should be raised, so as to favour the escape of the lochial discharge.

The apartment should be kept quiet, cool, and well ventilated, all soiled articles removed, the patient speak as little as possible, and all visitors, except a friend, excluded for four or five days. The woman is usually very sensitive and nervous, and should be kept as quiet as possible.

The diet ought to be water gruel, arrow-root, tea, coffee, when the woman is strong and in good health: but when delicate, she may be allowed a moderate quantity of wine, or spirit and water, or either of these, as well as beef tea, animal jellies, broths, fresh fish, fowl, lamb, rabbit, and nutritious aliments.

The function of parturition, when natural, and when the woman's health is good, requires little more attention than that of digestion, respiration, &c. But in all civilized countries, there is scarcely one

woman in twenty in good health; and hence the necessity of care and caution during labour and the puerperal or child-bed condition.

Hygienic Cares relative to Parturition.—Every pregnant woman should obtain the best medical aid for the period of delivery that circumstances will permit; and she should never employ a midwife alone, if she can procure an educated medical practitioner. The presence of a medical practitioner, and his confident assurance of her safety, will always inspire hope, and expedite delivery; and should any untoward event occur, a midwife who has not received medical instruction, and few in this kingdom have, is of no use whatever. She must be ignorant of anatomy, the structure, capacity, and peculiarities of the pelvis, womb, vagina, rectum, and all parts concerned in parturition, as delineated in these pages.

Let the parturient woman place the fullest confidence in the advice of her medical attendant, who should be duly educated; strictly follow his directions, have no opinion of her own, and pay no attention to any contrary advice that may be proposed by her nurse or others. She must always remember that time and patience are necessary for her delivery. If her medical attendant assures her that she is safe, she must have patience, and avoid gusts of passion, which render labour tedious, and often induce fatal convulsions, delirium, or even mania. Fortunately for humanity, the medical practitioner can now abridge labour, and save a great deal of suffering, without any operation, but merely by the exhibition of medicine. A midwife can afford no relief whatever, and generally does harm by her interference. I never knew a woman who was attended by a duly educated medical practitioner, who on any future parturition would admit a midwife. I have often heard women remark how very differently they were treated by their female and their medical attendants; and that females are much more unfeeling and unkind than those of the other sex. Nevertheless, midwives have still great influence over the lives of mothers and their infants, and they either preserve the human species by their knowledge, or tend to destroy it by their ignorance. This position was admitted in France nearly a century ago, and led the government of that kingdom to order all midwives to receive proper medical instruction; and not to practise without it under a heavy penalty.

The qualifications of midwives ought to be generally known and required.

They should be decent, modest, moral, religious, sober, regular, and humane in their conduct, and on no account commence practice without having received medical instruction. They should attend as speedily as possible in all cases, regulate the apartment, bedding, dress intended for the woman and infant, and prepare the appropriate food. They should never attempt to dilate the genital fissure, “to make room for the infant,” they should sit quietly and observe the efforts of nature. They ought to refrain from telling frightful tales, and likewise from administering strong liquors, which are not necessary in one case in a thousand, unless where the patient is delicate, or has suffered for a long time; and every woman of common sense ought to recollect,

that the inferior animals do well in labour without wines, spirits, ales, porter, &c.

Midwives and monthly nurses, as well as women in all ranks of society in this country, and so far as I can form an opinion, in others, are totally incompetent to give judicious advice during labour, or after delivery, in the vast number of varied circumstances peculiar to parturition, and ought, therefore, be obedient to proper medical direction. The older this class of women is, the less informed and more dangerous. There are a few prudent persons amongst them, but all presume too much, and profess to know much more about parturition and its consequences, than they really can or do. In sober truth, I have repeatedly known many women and new-born infants destroyed by their rash, ignorant, and presumptuous advice. They profess to know much more than the medical attendant, although, in general, perfectly ignorant of positive knowledge or information.

They cannot possibly know the mechanism of labour, or the relative positions of the infant to the bones and soft parts of the parent, either in natural or difficult cases, and consequently are incompetent to render proper assistance in the numerous presentations. The only aid that ordinary midwives give, is to separate the infant from the parent by tying and dividing the navel cord, and removing the placenta when it is expelled. Midwives are generally afraid to touch the woman; they do not know how to assist parturition, or discover a case of difficulty; and most painful labour is allowed to continue for hours or days, to the great injury, and often the destruction of the lives of mother and infant. I have been often summoned to women, who had been two, three, four, and five days in severe labour, which might have been terminated almost in as many minutes, the patient relieved from extreme suffering, and the life of her infant preserved. The truth of this statement will be evident by a reference to the plates and text of this work, by which it will appear that no person, male or female, who has not been properly instructed by a medical practitioner, can form a correct opinion on the process of natural labour, and the numerous cases which require manual and instrumental assistance.

There is also much care and judgment required for the moral management of a woman in labour and after delivery, which few nurses or midwives possess; and it cannot be denied by any practical obstetrician, that their ignorance, prejudices, and errors, are likewise most injurious to infants. (See also p. 168.)

But educated midwives are exceptions, as Madam Lachapelle and Madam Boivin of Paris, whose works are standard ones.

Hygienic Cares relative to the Puerperal or Child-bed State.—On the fourth or fifth day the bed may be arranged, or “made,” and the patient should be placed on her side, as before stated.

No broths, meats, eggs, or fish, are to be allowed until the fourth or fifth day after delivery, unless in cases attended with debility, as when the patient labours under consumption, liver complaint, or any other chronic disease. The lower classes, especially in the country, do well, as also the inferior animals, without high seasoned foods, spirituous or stimulating liquids, before or after delivery.

On the fifth day after delivery, a little beef tea, chicken broth, calves'-feet jelly, fresh eggs, light puddings, &c., may be given in small and repeated quantities; but should headache, flushed face, or rapid pulse be caused by any one of these, it must be immediately discontinued. Delicate women may take animal food immediately after delivery, but this is an exception to the general rule, and very rarely to be adopted.

When the mother has breast milk, it is unnecessary to give the infant castor oil, molasses, syrup of violets, oil of almonds, or butter and sugar, as the bowels will be purged by the first milk, or often without it; but should they not be opened in twenty-four hours, half a tea-spoonful of castor oil may be exhibited, and repeated in four or six hours, if necessary. Manna is also an excellent aperient for infants.

If the infant does not pass urine, some hours after its birth, the lower part of its abdomen should be fomented with warm water, or decoction of poppies, and the genitals examined, lest there be any unnatural formation.

It often happens, that the breast milk is not supplied at the time of delivery, and in such cases, the best substitute for the natural food is five parts of cream, or sweet milk, with one of boiling water, properly sweetened with loaf sugar. The cream, or milk, should not be boiled, but warmed when required, by placing the vessel that contains it in warm water. The frequency of giving food, and the varieties of diet, will be described hereafter.

The woman may sit up on the fifth or sixth day after delivery, if she feels able, and is of a strong constitution; but if delicate, not before the ninth, twelfth, or even twentieth day. She may feel giddiness on sitting up for the first time, pains in the back, loins, and lower extremities, which may continue for several days, but these will gradually disappear in most cases. She should not attempt to walk about her apartment sooner than the ninth day, or as long as the uterine discharge continues. This may be very much increased by sitting up, or attempting to walk; and the woman should not go into the open air, or take exercise, until it has entirely ceased, which may not be for a fortnight or a month. She should remain in bed or on a sofa for the greater part of the time while it continues. It is difficult to lay down rigid rules on this head, as constitutions differ so much. One woman will be pursuing her usual avocations on the fourth, sixth, or eighth day, and another not at the end of a month. It is well known that there is great liability to fevers and inflammations of the most fatal description after delivery, for two or three weeks afterwards: and, therefore, the preceding precepts ought to be strictly attended to. The bowels may be opened with a table-spoonful of castor oil, or any other mild aperient, on the second or third day after delivery, provided there is a supply of breast milk, or that the breasts are swollen; but if the milk has not formed, and the bosom remains flaccid, any aperient will impede the supply, by causing a determination of blood from the breasts to the abdomen. When it is desirable to prevent the secretion of milk, in cases when the infant is born dead, we do so by opening the bowels freely and repeatedly.

All strong liquors, exposure to cold, or too much heat, or sitting up

too soon, ought to be carefully avoided, as they may induce fevers or inflammations at any time during the first nine days after delivery, and sometimes as late as the second week. The chamber should be properly ventilated, the temperature regulated according to the season, and the bed clothes should be sufficient to cause comfortable warmth, but not too warm, as then both miliary fever and a superabundant lochial discharge would be induced.

When the breasts become hot, swollen, and painful, they should be fomented with a warm decoction of poppies and chamomile, and then drawn with a proper glass, or by the infant, or by an older child, or an adult. This subject I shall notice more fully hereafter. The woman should not rise from bed until the lochial, or child-bed evacuation has ceased; for, while it continues, the womb is not reduced to its ordinary size in the unimpregnated state, and therefore all bodily exertion will disturb it, render the discharge excessive, and cause a sense of bearing down, or falling of the womb, as it is termed, which is extremely distressing, and very common among the lower classes, who, in general, sit up too soon.

Most women are extremely sensitive after delivery, and hence they should be kept perfectly quiet, all noise, and strong mental emotions, or improper aliments, either solids or fluids, being highly injurious; so great is the nervousness after delivery, that any cause of alarm may induce convulsions or mania, and any kind of improper food or drink, or exposure to cold, excite dangerous fevers or inflammations. It is an axiom with medical practitioners, that more women die after delivery than during pregnancy and parturition.

It generally happens that the breasts become hot, swollen, and painful in a day or two after delivery, or later, in consequence of the determination of blood from the womb to these organs, for the purpose of causing the secretion of milk. Warm fomentations, as already mentioned, and afterwards the application of almond and olive oil are usually employed, and then natural or artificial suction. There is sometimes a slight fever for twenty-four hours, which is by no means dangerous, and is designated milk fever. A mild aperient and the ordinary fever medicines remove it.

Hygienic Rules relative to Lactation or Suckling—The secretion of milk, or lactation, is a part of the process of reproduction, and is essential to the well-being of the parent and offspring. It preserves the mother from febrile and inflammatory diseases, and it affords the aliment intended by nature for her infant. Every woman, whose constitution and health are good, ought to suckle her infant, but every one who is delicate, affected with chronic disease, or has little breast milk, should avoid it.

When the nipple is too short for the infant to seize it, artificial suction will be necessary, and this is effected by means of breast bottles, or various other contrivances. The nurse, or some child, or some adult, must effect it in many cases; and in former times a young dog was applied for the purpose. Unless the tumefied breasts are relieved, they are extremely liable to become inflamed. Artificial nipples, prepared teats, shields of wood, gum elastic, glass, and metal were tried, but of

these, the wood, covered with a prepared teat, is the best. Even this is liable to injure the infant's mouth, and should be laid aside as soon as the nipple is sufficiently elongated to be grasped by the infant.

During lactation, or suckling, the nurse should take nutritious aliments, such as described when speaking of pregnancy; she should avoid ardent liquors and acids, as vinegar, oranges, lemons, &c., the depressing or violent passions, which deteriorate the milk, and she should rarely expose herself to the development of a new pregnancy, and for ten or twelve months after delivery conjugal intimacy diminishes the secretion of milk, by exciting the womb and determining blood to it. Many women suckle for fourteen or twenty months to prevent pregnancy, and I have known those who continued wet-nurses for three years for this purpose. Nevertheless, many women who are anxious for family, employ wet-nurses, so that conception may speedily happen year after year; while the poor, on the contrary, suckle theirs for one, two, or three years to prevent its recurrence.

The infant ought to be applied to the breast every two hours, and even oftener when it is feeble, but after some weeks at the interval of three hours. It should be successively applied to each breast on every occasion, unless it is satiated with either; but some advise that one breast should be reserved for the next application. As often as the infant wakes, and evinces a desire for food by moving its lips, or crying, it should be applied to the breast, or have food, however frequent, for its whole time is passed at first, in eating and sleeping. Regurgitations, or vomitings, with hiccup, are easily relieved by dill, fennel, or aniseed water sweetened. It should be always remembered, that the breast milk will be affected by the food and medicine taken by the person who supplies it, and likewise, that it may be better in one breast than in the other. It may be superabundant with some women, and sparing or entirely absent in others. In the last cases, mercenary or artificial lactation will be necessary, and these I shall consider when describing the physical management proper for infants. On the present occasion, I notice the general rules relative to pregnancy, parturition, the puerperal state, and lactation, which are most conducive to the preservation and development of the infant before and after birth.

It is manifest to every one conversant with medical science, that unless the health of a woman, from the time of conception to the period of ablactation, or weaning, be good, the growth and health of her offspring will be affected. Every obstetrician, engaged in practice, must acknowledge, that some infants are born so feeble and delicate, that many of them expire immediately after birth, others in a few hours or days, several are reared with the greatest difficulty, and most of these are generally destroyed by the numerous diseases incidental to childhood.

It therefore follows, that the consideration of the rules for the preservation of the health of pregnant women, during labour and in childbed, as well as nurses, is essential to the conservation and vigour of infants, as well as to the increase of population.

Physical Management of the New-born Infant.—Washing the Infant.—

There is a whitish unctuous substance on the whole or many parts of the body of the infant at birth, which ought to be removed by means of a soft sponge or piece of flannel, with warm water and mild white soap; and sometimes lard, olive oil, or fresh butter must be applied, as also a tepid bath to facilitate its removal.

A lather of mild white or palm soap should be applied to the head, due care being taken not to allow the eyes to be irritated by the solution.

Ardent spirit of any kind, as brandy, rum, &c., ought not to be applied to the head unless swollen, as it is unnecessary and injurious; its rapid evaporation causes cold, which ought to be avoided.

The neck, body, limbs, and all creases should be well washed, dried with a soft old napkin, and then all the creases powdered with hair powder, as those behind the ears, in the neck, under the arms, and between the thighs. During the washing of the infant, all hasty or violent movements of it ought to be avoided.

If all the white matter cannot be removed by the first washing, the nurse should avoid all rough attempts which would cause irritation, or inflammation. Some lard, or other oily substance, should be applied, and the second washing usually removes it.

The breasts of the infant are sometimes swollen, and contain a serous fluid. It is highly improper to press it out, and the best application is gentle friction with the hand alone, or with olive, almond, or camphorated oil. Should inflammation set in, warm fomentations, and poultices ought to be applied; and if suppuration occur, which is very rarely the result, the abscess may be opened as soon as possible.

Washing and dressing the infant should always be performed with great gentleness and tenderness, for if effected hastily and rudely, the infant cries or screams, the best criterion of an awkward mother or nurse. To remedy this, the infant is addressed in a loud and angry tone, and is greatly frightened, and screams more loudly from fear. In all cases, gentleness, and soothing language, are indispensable, even in the case of a new-born, or young infant; who is soothed, and evinces the pleasure it feels by "crowing," as it is termed, and stretching its limbs while it is being washed, powdered, and dressed. No one who has not observed it, could believe the sedative effect produced by speaking soothingly or buzzing into the ear of a young infant.

The whole body of the infant should be washed every morning, with tepid water in cold weather, and each part dried after ablution. Those parts liable to be soiled should be washed, dried, and powdered after each evacuation, both day and night, or excoriation will be speedily induced.

After the third month, the whole body should be washed once or twice a week; and from the sixth month upwards, once a week. Saturday night is usually termed "washing night" in all well regulated nurseries.

During the first two years of infancy, a warm bath is supposed by mothers to be a panacea for all infantine diseases.

I have already advised, that whenever a young infant wets, or soils

itself, its napkin should be changed; it should be washed, dried, and powdered, and a clean napkin applied.

An anxious mother, or a good nurse, will observe its movements when about to evacuate the bladder or bowels, and if due attention be paid to "holding out," the infant will soon "give notice," even when asleep.

I enter into these minute particulars, as some of my inexperienced readers may term them, for the preservation of infantine health, as well as for that of mothers, nurses, and all inmates of families, in which there are young infants, who, if mismanaged, or unwell, very often disturb every one in the house, and more especially during the night.

When an infant arrives at the age of a year and a half, and upwards, it never should be allowed to soil its nursery, and may always be prevented, by moderate care and attention. Whenever an almost thoughtless, and perfectly helpless infant of this tender age soils its dress, or the apartments, nursery, or otherwise, in which it is placed, there is a clear proof of carelessness, and incompetency upon the part of the mother, or nurse. It is also a great error to convert every apartment in a house into a nursery; it makes all inmates uncomfortable, and is the strongest evidence of foolish and bad management. Nevertheless it is of very frequent occurrence.

The remainder of the navel string is to be wrapped in a small piece of old soft linen, in the centre of which an opening is cut, through which the cord is passed, then turned towards the chest on the abdomen, and secured in this situation with a small flannel bandage. Burnt rag is commonly applied to the navel string by nurses, but this is a useless and objectionable remedy.

The remains of the navel cord generally fall off from four to ten or more days after birth, and during the time it adheres, its root may be touched or dressed with olive oil, spermaceti ointment, or simple cerate, once or twice a-day.

The dress of a new-born infant ought to be sufficiently warm and loose, and never impede the respiration, or induce redness or lividity of the face. It should be open at the back, and secured with buttons or tapes, in preference to pins.

The infant should be perfectly at ease, and enjoy freedom of motion in every part of the body, or deformity or delicacy will be the result.

It should breathe a pure air, not too hot or too cold, too dry or too moist, or impregnated with deleterious gases or odours. It ought not to be exposed to the glare of a candle, fire, or of the sun, immediately after birth, as any one of these exposures may cause inflammation of the eyes. Its head and cheeks should be covered with its flannel blanket, as it is termed, the mouth being uncovered; and it is only by degrees that its eyes can become accustomed to daylight with safety. The chamber in which a new-born infant reposes, should be perfectly quiet, so that it may sleep soundly, and never be awakened suddenly. The bed, cot, or bassinet should not be too soft; for example, a pillow of some kind may form the bed at first, the infant covered with its new flannel placed on it, and a blanket or a shawl thrown

over it. Violent rocking is always injurious to the brain and general health.

A new-born infant should not be taken out of its bed-room for three or four weeks after its birth, as it is readily affected by cold, and may be destroyed by inflammation of the lungs, fever, convulsions, &c. The practice of taking it through the house, from one room to another, while the mother is asleep, is highly reprehensible, even during the warmest weather.

The napkin applied over the lower part of the abdomen, and over the genitals and anus ought to be loose, so as to allow a free movement of the lower limbs. Great cares should be taken in placing pins in it.

The first clothes are generally too long, they become twisted about the legs, and impede their movement and growth. This dress, termed long clothes, need not be worn more than three or four months in warm weather. Every infant should have its day and night clothes.

It is a useless practice, when there is breast milk, to exhibit butter and sugar, molasses, manna, castor oil, syrup of violets, &c. to a new-born infant, as the first milk, called colostrum, of the mother, will purge it efficiently. The inferior animals do well without aperients.

After the birth of the infant there is an immediate determination of blood from the womb, in which it is no longer necessary, to the bosom; which causes the breasts to swell, become hot and painful, and secrete milk. There is usually head-ache, thirst, hot skin, rapid pulse, for a few hours, and this is termed milk fever, which is never dangerous, and rapidly yields to the use of aperient and diaphoretic remedies. In some rare cases there is no determination of blood to the bosom, no secretion of breast milk, and no milk fever. The absence of these phenomena may be caused by bad health, or peculiarity of constitution.

It is important to state, that when the infant is born dead, brisk purgatives should be repeatedly administered, and cold astringent lotions applied to the breasts, to prevent the secretion of milk, unless the woman intends to become a wet-nurse.

When the breasts become hot, swollen, and painful, in twenty-four, forty-eight, seventy-two, or more hours after delivery, they should be fomented with a decoction of poppies and chamomile, or simple warm water, in the proportion of a pint, with one or two teaspoonsful of laudanum; and rubbed with almond or olive oil. They should also be drawn by a strong child, adult, or by means of some instrument, provided the infant be alive, but never when born dead.

All healthful women ought to suckle their infants, as the breast of the mother affords the most natural aliment. But when there is no breast milk, the best substitute is fresh or new cow's milk, with a sixth part of tepid water, and some loaf sugar; and the quantity for each repast, which ought to be given from a sucking bottle, is about three table spoonsful. Gruel, arrow-root, or pap, and all farinaceous aliments, are much inferior to milk, as this is the food intended by nature, although these foods are very generally administered.

The healthful infant will require food about every two or three hours for the first month or two; but when delicate may sleep for six or more

hours. After each repast, the infant ought to be placed on its right side in bed with the mother, or in a warm cot, when it will fall asleep. This position is most favourable for the passage of the food from the stomach into the bowels. The infant in health generally wakes every two or more hours to take food, and after it is supplied, the nurse should examine whether it is wetted or soiled, and in either case, remove its napkin, wash it with tepid water, wipe it dry and powder it, and put on another napkin. When the bowels do not act for some hours after birth, half a tea-spoonful of castor oil, or a drachm of manna, may be administered, and repeated if necessary.

When the infant is still born, it may be recovered by the following means. Artificial respiration ought to be induced by closing the nostrils, pressing the windpipe against the œsophagus and spine, and then blowing into the mouth, with or without the tracheal pipe. As soon as the lungs are inflated, pressure is to be made on the ribs with the hands, so as to expel the air, and the inflation is to be speedily repeated. The process of artificial respiration ought to be continued for an hour, or an hour and a half, during which period the infant is to be immersed in warm water, and some ardent spirit, or sal volatile, or hartshorn, rubbed over its cheeks, neck, and chest, to excite the respiratory nerves of these parts. Some recommend slapping it gently on different parts of the body.

When the face is dark or purplish, there is congestion of the brain, and the navel-cord may be allowed to bleed one or more tea-spoonful during the artificial inflation of the lungs.

The tracheal pipe is used as follows, (see *plate 40*):—the obstetrician passes the fore-finger of the left hand into the infant's mouth, depresses the tongue, and feels the opening of the glottis at the top of the windpipe. The tube is now passed along the finger into the windpipe, the finger is then carefully withdrawn, the nostrils and lips closed, and inflation of the lungs commenced. When the lungs are distended with air, pressure should be made on the chest in the manner already described, and the inflation continued for an hour, an hour and a half, or two hours. The warm bath, and application of ardent spirit or sal volatile to the face, chest, and spine, are to be used at the same time.

It is necessary to be cautious with the tracheal pipe, and not to injure the larynx.

The first sign of resuscitation, is the slight pulsation of the heart, which is soon followed by respiration, but recovery does not always happen.

Hygienic Cares relative to the Puerperal or Child-bed State.—*Management of the Mother after delivery.*—The obstetrician ought to visit a puerperal woman about twelve hours after delivery, and inquire how she has slept, ascertain the state of the pulse, lochial discharge, the milk, bowels, and bladder.

If the pulse is under 100, and if the woman has slept well, has the lochial discharge moderate, has evacuated the bladder and bowels, has milk or the breasts distended, the after-pains trifling or absent, she is going on well, or, to use a popular phrase, “she is as well as can be expected.”

But when the bladder has not been evacuated, the lower part of the abdomen ought to be fomented with warm water, or a decoction of poppy-heads, chamomile, or marsh-mallow, and by means of a piece of flannel or sponge, and should this fail, the use of the catheter will be necessary in a few hours, (see p. 43).

The bowels should not be open until the secretion of milk has commenced, which may be a day, two, or more, after delivery.

The exhibition of a purgative within twenty-four hours after delivery, an ancient custom, before the breasts are distended, and the milk is secreted, causes determination of blood to the intestines, prevents it from going to the breasts as nature intended, retards or prevents the secretion of milk, and ought to be avoided.

It is for this reason that when the infant is dead, brisk and repeated purgatives are given immediately after delivery, which prevent the secretion of milk, or speedily suppress it.

Moreover, a judicious obstetrician will have ordered the bowels to be daily regulated for weeks before delivery, as already stated; and the nutritious diet of the woman during and after labour, forms very little excrementitious or fæcal matter.

Regimen.—Much error exists as to the regimen of women after delivery; but parturition is as natural a function as digestion, respiration, &c.; and when natural, the woman being in good health, and a wet-nurse, there is little, indeed I should say no occasion to deviate from her ordinary diet; but of this the medical practitioner is the best judge. I have repeatedly known women who partook of their usual food, before and after delivery, with perfect safety.

When the woman intends to nurse her infant, she may have moderate quantities of water-gruel, tea, coffee, arrow-root, and toast for breakfast; weak beef or chicken broth, and light pudding, for dinner; and gruel, arrow-root, tous-les-mois or canna-root, or any mild vegetable jelly for supper. She may also have a small quantity of malt liquor, with the chill off in winter, though this is not necessary for a healthful woman.

It is well known that there is a great predisposition or liability to dangerous fevers and inflammations after delivery, and hence the necessity of attention to regimen, temperature, quiet, repose, and all other rules advised by medical practitioners. When the woman, from whatever motive or cause, does not intend to perform the natural and delightful duty of wet-nurse, her diet should be sparing, and principally vegetable and farinaceous, so as to prevent or diminish the secretion of milk.

When the woman is delicate, she may have animal jellies, chicken, &c., and a moderate quantity of wine, diluted spirit, or porter, or ale, the day after delivery. A healthful woman may take chicken, rabbit, fresh fish, lamb or mutton chop, on the fifth day after her confinement.

Wine, spirit, and fermented liquors are not necessary for a woman in good health, during or after delivery, though she may use them in moderate quantity, but when taken freely, they expose her to dangerous fevers and inflammations.

If the after pains are troublesome, they arise from clots of blood in the womb, or spasm of that organ, and the sedative draught ought to be repeated. When this fails to afford relief, the finger should be passed into the vagina or orifice of the womb, to remove the clots of blood or pieces of membrane, or a mild aperient may be exhibited, and the action of the abdominal muscles during its operation will cause their expulsion.

The patient, in most cases, should not be allowed to rise to have her bed made sooner than the fourth or fifth day; and even then she ought not to sit up, but lay on a sofa drawn close to the edge of the bed, or on chairs, while the latter is being adjusted.

The period during which a woman should remain in bed after delivery, will vary according as her labour has been natural or difficult. In the first case, she may get up on the ninth or tenth day; but in the second, not before the lapse of several weeks.

She ought never to sit up or walk about before the lochial discharge has nearly ceased, or is very trifling in quantity, and that is about the ninth or twelfth day after delivery, and sometimes much later, for this is very much increased by sitting up, or walking too soon.

At first she ought to sit up, or recline on a sofa, her back being properly supported with pillows, for two or three hours only; and she should be most careful to guard against the extremes of heat and cold.

Women often feel a sense of giddiness, pains in the back, loins, and lower extremities, on sitting up for the first time after delivery, and particularly if they do so too soon; but though these unpleasant sensations may continue for several days, they speedily disappear in almost all cases. A great deal depends upon constitution, and the kind of labour. One woman may be pursuing her usual avocations on the fourth, sixth, tenth, or twelfth day, while another may not be able to do so sooner than the expiration of two, four, six, eight, or more weeks after delivery.

At the expiration of three or four weeks, but generally sooner, when the lochia has ceased, she may join her family circle, and take an airing in a carriage, or other vehicle, in favourable weather.

Women in the lower rank of life, and those in good health, rise from bed and walk about much sooner than the period now advised; and they often do well, but more commonly suffer from prolapsus, or falling down of the womb, repeated hemorrhage, nervousness, lowness of spirits, despondency, dyspepsia, leucorrhœa or whites, hysteria, and various other complaints, for weeks or months after delivery. As a general rule, no woman ought to rise from her bed, or even sit up, until the lochial or child-bed discharge has nearly ceased; for while it continues, the womb is enlarged, and not reduced to its ordinary size, and may fall into the pelvis, or bear down during sitting, walking, or standing, and lay the foundation of a most troublesome disease.

The poor, who cannot follow this advice, and who sit up and exert themselves on the fourth or fifth day after delivery, generally suffer from some one or more of the complaints just mentioned.

During the first month, the infant is to be applied to the breast every

two or three or more hours, or as often as it awakes from sleep during the day or night; and if the milk is good, and the nurse in health, it will require no artificial food, and *vice versâ*.

Hygienic Rules or Hints for the Physical Management of Infants.—The new-born infant, while it is being washed and dressed, may have some butter and sugar given to it, though this food is by no means absolutely necessary, unless the infant cries and seems hungry, which is often the case, and it may be applied to the breast when there is milk, in half an hour or an hour after delivery, or, as soon as the mother has recovered from the fatigues of parturition.

Some eminent obstetricians advise that the new-born infant may be applied to the breast in one, two, six, eight, or sixteen hours after birth; but I am well convinced, from much reflection and careful observation, that nature points out the necessity of food as soon as possible after the separation of the infant from the mother. I need not contend, that until the time of separation, the infant is constantly nourished by the mother's blood; and after the separation, I am at a loss to perceive, upon scientific grounds, how it is to be deprived of nourishment for one or sixteen hours. I have never seen one single case which warranted this conclusion. The early application of the infant to the breast, elongates the nipple, hastens the secretion of milk, prevents milk fever, or diminishes its intensity, as well as prevents sore nipples and breasts.

The infant ought not to be applied immediately after the mother or wet-nurse has taken a full repast, or while she is under the influence of medicine, as in both states her milk may more or less disorder the infant. The same rule is to be observed when she suffers from strong mental emotions, of whatever kind.

A wet-nurse ought to avoid spiced, salted, smoked, and oily animal substances, pork, duck, goose, &c., and also crude vegetables, pickles, unripe fruit, and spirituous or vinous liquors, unless when she is delicate or in bad health.

Light broths, milk, whey, coffee, cocoa, chocolate, home-brewed ale, stout, or porter, are the best drinks, and a pint or a pint and a half of the two last is sufficient during twenty-four hours, though by no means necessary or natural, but generally taken by the middle and lower classes to increase the supply of milk.

Tea and coffee may be used moderately.

A wet-nurse ought to attend most closely to the infant committed to her care, and avoid all crowded assemblies, balls, theatres, cold, damp, &c.

Mercenary Lactation, hired Wet-nurses.—Bad health, or disease of any important organ, as phthisis, liver complaint, regular menstruation during pregnancy, or soon after delivery, as well as numerous other complaints, may prevent a mother, or other wet-nurse, from suckling an infant. In such instances a hired wet-nurse should be procured, in all cases in which pecuniary circumstances will permit, because the best food for an infant is human milk, although that of inferior animals may be substituted, but certainly it is of a far inferior quality.

A hired wet-nurse ought to be healthful, good-tempered, careful, fond of children, watchful at night, patient, sprightly, cheerful, active, have a good supply of milk, and a healthful infant of her own.

She ought to be from twenty to thirty-five years of age, of a good constitution, in all respects, and her infant not more than from one to six months older than that of which she takes the charge. She should live regularly, as regards regimen, diet, air, exercise, sleep, &c., &c. She ought to avoid nuptial intercourse, as much as possible.

She ought to be treated most kindly by parents who entrust their infant to her care.

Artificial Lactation, or Dry-nursing.—There are many circumstances which prevent maternal or mercenary lactation, and oblige parents to resort to artificial, or dry-nursing.

The best substitute for human milk, is that of the ass or young cow, with a sixth part of tepid water and some loaf sugar. Three table-spoonsful are sufficient for each repast for a new-born infant. Asses' milk has a decidedly sedative effect. I have known it, in a lady affected with phthisis.

The milk of the ass or young cow is best, though that of the goat, mare, sheep, camel, &c., is used in different countries. It is mixed with a sixth part of tepid water, and placed in what is called a sucking bottle, made of glass, porcelain, &c.; the extremity of which contains a small piece of sponge covered with wash leather, or a piece of muslin, or a heifer's teat, so secured by thread as not by possibility to be swallowed by the infant.

Suction is as necessary to an infant as mastication to an adult.

It is necessary to rinse the bottle, and change the sponge very frequently, and, some say, its covering, every time it has been used.

This method is infinitely superior to spoon feeding, which exposes the infant to swallowing much air, which causes hiccup, vomiting, flatulence, colic, &c.

When the infant sucks the food, it takes it slower, and the stomach is less likely to be overloaded than when a spoon or boat is used.

About the third or fourth month, a healthful infant may have vegetable jellies, as arrow-root, gruel, canna-root, tapioca, mixed with milk and sugar, chicken or beef tea, gravy mixed with dry mealy mashed potato, or the latter with butter; and these should be changed from day to day. Food should be given four or five times a day.

The milk should not be boiled, or repeatedly heated, and only sufficient for a repast prepared at a time.

The inferior animals of the mammiferæ are nourished with milk only.

The infant ought to be kept warm, clean, and changed whenever it wets or soils itself, and in such cases washed with tepid water, dried, and powdered, and a clean napkin applied round its hips, trunk, and inferior part of the abdomen.

John Hunter well observed, "give infants plenty of milk, plenty of sleep, and plenty of flannel."

It is well known that an infant, from the moment of birth to the tenth or twelfth month, may, according to its health, strength, and

development, be dry-nursed or brought up by artificial food; and more especially when it has arrived at the sixth, tenth, or twelfth month of age; and in such cases farinaceous foods, hereafter described, are exhibited with advantage, although very different and very inferior to the aliment intended by nature. These foods are in general given before the period of ablactation or weaning.

Farinaceous aliments ought to be used sparingly at first, and always mixed with fresh or new milk. They are most appropriate before the time of weaning.

Ablactation or Weaning may be accomplished when the infant is vigorous, after the appearance of the milk-teeth, which varies from the sixth to the twelfth month, or even to the second year.

This process may be commenced at birth, when the mother dies, but in most cases it cannot be accomplished with safety before the time just stated.

Weaning ought not to be attempted when the infant is delicate, teething, or labouring under any severe disease, as the breast is decidedly the best sedative for infants, even if the milk is deteriorated. It ought not to be commenced during winter, unless pregnancy has recurred.

The infant should now be applied to the breast as seldom as possible during the day, and artificial food given to it, but it must be applied, in most instances, once or twice at night, according to its fretfulness and wakefulness. It is a cruel and barbarous practice to rub the nipple with soot, a solution of aloes, &c., to disgust the infant—a plan only advised by illiterate nurses and midwives. Weaning should be commenced when the infant is in good health, and seldom suddenly. When pregnancy or menstruation occurs, the milk becomes more or less deteriorated, and weaning should be commenced, but not when the infant is affected by teething, diarrhoea, cough, or any febrile or acute disease.

In addition to the foods already mentioned, the infant may suck a piece of roasted or boiled meat, and have aliment as often as it seems to require it; and no precise rule can be laid down upon this subject.

With respect to the management of the breast to suppress the milk, it will be found in the section on wet-nurses; and I shall here briefly remark, that low diet, free purgation, with cold and sedative applications to the mammæ, are the best remedies. The following application has been strongly advised by Dr. Ranque, of Orleans, as an effectual remedy for the suppression of the milk, and succeeds in three or four days:—℞. Aq. Lauri—ceras., ʒij; Spts. Æther. Sulphur., ʒj; Extract. Belladonnæ, ʒij. M. in usum. The breasts to be gently rubbed with some of this application three times a day; others cover them with lead plaister spread on leather. They should not be drawn or fomented with warm fluids if it can be possibly avoided.

The diet should be sparing; and aperients used daily, for the reasons assigned in p. 195.

Weaning should be commenced gradually, and not suddenly, the infant being first accustomed to ordinary food; for in the last men-

tioned case, it becomes fretful, peevish, and rapidly out of health, and often pines or dies unless applied to the breast.

Children have their likes and dislikes, as regards foods, as well as adults, and ought not to be compelled to take any food which they disrelish. Light puddings, eggs, fresh fish, gravies, soups or broths mixed with arrow-root, mealy potato, bread-crumbs, sago, tapioca, touselles-mois or canna-root; ripe fruit, such as apples, pears, oranges, strawberries, grapes, &c., the pips or seeds being removed, may be used in moderation by infants from the second to the fifth year, and upwards.

Boiled or roasted meats are best for children; fried, broiled, stewed, or minced, are less proper.

The drink ought to consist of milk, milk and water, barley or common water, weak tea or coffee with a large portion of milk, toast and water, a small quantity of ale or porter, as half a wine-glassful diluted, or a tea-spoonful of sherry diluted with water, when the infant or child is delicate; but all stimulants, as fermented and other liquors, should be administered only as medicines.

Solid animal food, as beef, mutton, &c., is improper for young children before the age of a year or two, as they do not sufficiently masticate or chew it, and it produces irritation in the stomach and bowels. Too much food is generally given to infants, but they ought to be left to their own discretion or inclination as to the quantity; and the quality ought to be most nutritious.

Sleep, when natural, is extremely beneficial to new-born infants, but not when induced by violent rocking or motion, which causes more or less coma, or drowsiness, in consequence of determining too much blood to the head.

The infant ought to be allowed to sleep and wake whenever it pleases. All violent rocking in chairs, cots, or cradles, is injurious to the brain and to the general health.

In proportion as the infant becomes stronger, it requires less sleep, and at this period moderate exercise by dandling, &c., is very beneficial. During the first month, the infant is more than two-thirds of its time asleep; indeed it does little else than sleep and awake to take food.

When badly managed, it often sleeps the greater part of the day, and is awake the greater part of the night, disturbing the mother, father, and all inmates of the family. This arises from keeping a light in the bed-room at night, which generally attracts the infant's attention, and "wakes it up," when it is spoken to, carried round the room, and rocked in a chair or cot.

A healthful infant should never be taken up at night, unless to have its dress changed when required, and the nursery lamp should be as dim as possible, and so placed as not to attract its attention.

An experienced mother will apply her young infant to the breast, or give it artificial food immediately before putting it to bed for the night; and when this is done, the healthful infant will seldom, if ever, awake during the night, unless delicate, and when it does, she will supply the natural food, which, in most if not all cases, will speedily put it to sleep.

An affectionate mother, however inexperienced, as most are at first, will soon become accustomed to the presence of her infant, and perceive its slightest movements, even when she sleeps, and alter its position and attend to its wants without waking. There are, of course, many exceptions.

The night-clothes of an infant should be loose, so as to allow a free motion of its limbs.

A very young infant generates little heat, and must be very warmly clothed, and sleep at first, especially in cold weather, with its head on the mother's bosom. It may also be placed in a cot, crib, or bassinet during the day, when it sleeps, but near a fire in winter. It should be turned from side to side in a long sleep. When it arrives at the age of five or six months, it may be placed, in summer or warm weather, in a cot, crib, &c., by the bed-side, as it generates sufficient heat to keep it warm. It is very bad management to allow the infant to sleep all day, and be awake all night; and no soothing syrup, under whatever name, should be administered to it, unless by a qualified medical practitioner, whenever one can be obtained. A vast number of infants are injured and destroyed by this class of remedies, when used too freely and without proper advice, as is generally the case.

The infant should be kept warm, and always so placed that it cannot possibly slip or fall out of bed.

It ought to be placed on the right side in bed, to facilitate the passage of the milk or food from the stomach into the bowels. It may also be turned on the left side; and of all positions, the back or face is the worst, which may cause suffocation, especially during vomiting.

The *clothing* should always be suited to the season, so that exposure to cold and damp should be invariably avoided. Exposure to cold and improper food, are the most prolific causes of diseases of infants.

It has been computed that half mankind perish from cold before the end of the third year.

Air and exercise in the nurse's arms, or in a carriage, or on foot, are as necessary for children as for adults.

I may here observe, that every possible movement of an infant is a degree of exercise; for different sets of muscles are exerted by all such motions, as well as by those of the infant itself.

During the first month, a new-born infant requires but little exercise, as the fatigue it undergoes while being washed, dressed, and changed, as well as being carried across the room, or dandled by the nurse, is quite sufficient movement for it. In fine weather it may be taken into the open air properly clad, at the end of the month, and the person carrying it should hold it in the horizontal or lying position, and avoid all sudden movements, as jumping, running, &c., as well as standing or sitting in cold situations, as at corners of streets, on the steps of hall doors, &c. The nurse should hold it successively on both arms, for every time she changes its position in the slightest degree, a new set of muscles are thrown into action, relief afforded to, and exercise taken by, the infant. Carriages are dangerous, unless the infant be properly secured in them, as they often jolt violently, and injure the

brain; or they may be overturned, and thus expose their tender occupants to falls, contusions, fractures, wounds, &c., (*see Walking.*)

An infant is exercised by being carried in the arms, rocked in a cot or cradle, by rubbing its body or limbs at the time of dressing or stripping, by dandling, by its laughing and crying, by riding in a carriage, by crawling, walking, jumping, running, dancing, &c.

The infant finally acquires the power of assuming the erect position, of standing alone, walking along chairs, &c., when it ought to be carefully watched and assisted.

It ought to be placed on the carpet when able to sit upright, with its toys about it, when it will move about to collect them.

But it is now very much exposed to falls and injuries, which, unless prevented by the nurse or mother, often destroy its life.

The mother, or nurse, who can rarely be depended upon, as she may or may not be a mother, should assist the infant in its first attempts to walk, by holding it by the hands, or by passing a long shawl round its body, by which it can be supported in the erect position, or by being placed in an infant's carriage, properly supported by being tied to it with leading strings; but in all these positions great care must be taken not to compress the chest too much, or force the head too much forward.

Cleanliness and washing are essential to infants. Daily washing with tepid water in winter and spring, and cold in summer, either locally or generally, is highly beneficial. This is good at all times, and indispensable in cold weather.

Cold bathing, as well as washing with cold water, is now universally condemned for delicate or feeble children.

Exposure to the air is necessary, but hardening—as it is termed—exposes the child badly clad to great danger, is most injurious, and often induces fatal inflammations of the respiratory organs. The clothing should *always* prevent the bad effects of the weather, in all seasons.

Dentition or teething is a natural process, and unaccompanied by pain when the infant is in perfect health, and properly managed as regards diet, clothing, cleanliness, sleep, air, exercise, &c.

But it is, in general, a painful process, because few infants are properly managed or brought up by mothers or nurses, and very few are in good health.

Incision or lancing of the swollen gum over a projecting tooth, is highly beneficial.

But this is a barbarous and unwarrantable practice, to cut the gums from one angle of the jaw to the other, as is sometimes done, even when there is only one tooth coming through, and consequently one point of the gum inflamed. A crucial incision should be made in all cases; and this is by no means so painful as is generally supposed. I have met with infants who never murmured while it was being done, but most cry loudly, then fall asleep, and awake sprightly and in good spirits and health.

Other diseases, which are sympathetically excited by teething, as cough, diarrhoea, &c., are to be treated on ordinary principles.

Every healthful infant ought to be *vaccinated* after the sixth week, to prevent the danger and dreadful mutilations caused by small-pox, and too often death itself.

Children ought to be always treated with kindness, and corporal chastisement avoided in all instances, until reason is developed. "Spare the rod and spoil the child," is now most properly an obsolete maxim. Moral management is universally preferred by all enlightened individuals of the present age.

Severity towards children is cruel, unjust, and most injudicious.

When physical correction is necessary, it should always be inflicted with regret and gentleness, and never with a display of anger.

I have never used it or allowed it to be used with my own children, who have been managed morally, nor has it been necessary, under seven years of age, nor since. I have also maintained this opinion with the principals of some of the best conducted schools in this country, and they have, in most cases, agreed with me. They have, however, contended that corporal chastisement is necessary in some very rare cases, as in one or two instances in large schools. I admit, that when all moral means fail, this may be the case, but I think very rarely. According to human physiology, or the history of nature, it is very erroneous to suppose that a child, either boy or girl, at home, or at school, can think like their parents, masters, and governesses, for they want sufficient observation and experience. It is now considered a great improvement that there is no corporal punishment in modern infant schools, but moral influence alone is exerted to correct infantile faults and deviations from adult advice, which is often very objectionable and erroneous.

Never was there a more correct axiom than—"when I was a child, I thought and acted like a child, when a man like a man."

I likewise maintain another position, that all children, of whatever sex and personal appearance, ought to be treated alike by parents, who caused their existence. It must be clear to every rational person, that children are not responsible for their sex, personal appearance, or family resemblance; a moment's reflection must prove they have nothing whatever to do with the primary cause of these characters, which entirely depend upon their parents. Nevertheless, how often have I known the greatest cruelties inflicted upon unfortunate children, by ignorant and tyrannical parents, on these unjust accounts, of which the public press of this metropolis, and most countries, so frequently records examples.

A feeling of jealousy ought never to be allowed to exist between children; there should be no marked preference. All children are equally dear to moral parents.

The infantile constitution is frail, and easily injured by external agents, and hence the frequency of its diseases.

The diagnosis of these complaints is difficult, as the little sufferers cannot, in most cases, give any, and, in others, a proper account of the symptoms.

Literary education ought not to be commenced until the age of six or seven years; but the nature and uses of external objects should be always correctly explained to children.

Modern infant schools are very superior to the old-fashioned establish-

ments, as they combine exercise, amusement, and competition with instruction, and have no corporal punishment.

Much knowledge may be communicated by the representations of pictures, or figures of birds, beasts, fishes, insects, herbs, trees, fruits, and mechanical inventions, by means of toys, prints, books, &c.

The utmost regard for truth, and abhorrence of falsehood, should be always inculcated on children, and the divine principles of religion instilled into their tender minds.

An open and candid disposition ought to be applauded, and an acknowledged fault rebuked with mildness, and then forgiven.

All questions put by children ought to be answered correctly, and the nature of surrounding objects explained to them, which is seldom done by mothers, or nurses, or others.

An affable, modest, and polite behaviour, should always be cultivated and applauded in children and youth.

The memory and intelligence must not be too much excited, as disease of the brain, and bad health, nay, death itself, may be rapidly induced.

It has been long observed by physicians that children who are prodigies in learning, music, and other pursuits, are generally destroyed by premature disease of the brain, as water in the head, and many other complaints.

Due attention should be paid to a correct articulation and pronunciation, and the meaning of words explained.

Children under the age of four years ought to be constantly cautioned against hurting themselves with surrounding objects, and the danger, pain, and bad consequences explained to them, as well as the impropriety of destroying property of whatever kind.

The greatest judgment is required in treating the diseases of children, and medical aid ought therefore to be procured whenever it can be obtained.

The science and practice of infantile medicine, require deep study, and extensive observation.

Large volumes have been written on the subject, and a long course of lectures is necessary to comprehend it, (see Author's Lectures already quoted).

The delicacy, peculiarity, and sensibility of the infantile constitution, the predisposition to a vast number of diseases, the want of speech and of reason, the difficulty of detecting diseases and fixing appropriate doses of medicine, render the study and knowledge of infantine medicine much more difficult than is generally imagined.

It was for this reason that I published in the *London Medical and Surgical Journal*, 1833—34, Sixty Lectures, each of which occupied an hour in delivery, amounting to 800 pages ordinary octavo, on the *Physical, Moral, Intellectual, and Educational Management of Infants and Children, from Birth to Puberty*, as well as on the *Nature and Treatment of their Diseases*—subjects, so far as I know, never before treated of so extensively, and consecutively, and the leading conclusions on which are inserted in the third part of this work.

Mankind in all nations, whether civilized or savage, have hitherto

neglected the study of infantile hygiene and medicine ; they have been too much engaged in the physical management of inferior animals, and unmindful of that of their offspring. All classes of men appear to be disgusted with the early wants of their offspring, whether physical, moral, or medical. Hence the immense mortality of our race, which is incomparably greater than that of all inferior animals. But nature never intended this great fatality ; it is the baneful result of human ignorance, folly, and error.

CHAPTER X.

GYNÆCOPATHOLOGY—DISEASES OF WOMEN—DYSTOCIA—DIFFICULT, OR PRETERNATURAL LABOUR.

Definition.—Labour which is not completed in twenty-four hours, or by natural efforts alone, or when the infant does not present by the crown of the head; or feet, when it is transverse to the outlet of the pelvis or across, when there are diseases of the woman or infant, or when artificial aid is necessary. The causes which retard parturition are moral and physical, as fear, anxiety, despondency, &c.; resistance to the passage of the infant, which may depend on the mother or on the foetus.

The obstetrician possesses three means of assistance in difficult or preternatural labours:—1, the hand alone ; 2, blunt instruments, or tractors ; 3, incisive or cutting instruments.

The respective cases in which these means are required, will be fully described in the following pages.

Rigidity of the External and Internal Genitals is the commonest cause of resistance in first labours, in very young or aged women.

The *Treatment* consists in blood-letting, fomentations to the external genitals, the free introduction of lard, regulation of the bowels by an aperient, or an enema, or clyster, and afterwards an anodyne draught. In cases of delicate women, the enema opii—℞. T. opii, ʒss ; Decocti Amyli, ʒiv. M.

The obstetrician ought to avoid frequent vaginal examinations, which do injury in such cases. The ergota, or ergot of rye, would be improper in such circumstances. Time and patience are indispensably necessary.

Disproportion between the head and pelvis, or the bones through which the infant comes into the world, or when the head is unusually large by development or disease, and when too much ossified, or the sutures closed.

Treatment.—Time and patience, nutritious aliment, and cordial drinks ; the use of the forceps, lever, or perforator, when the labour pains have been strong for six hours, the head firmly pressed against the soft parts lining the pelvis, the perineum undilatable, when the woman is in danger of dying undelivered, or may be so contused that sloughing

of the bladder or rectum may ensue in a few days. When the infant's head is enlarged by hydrocephalus, paracentesis cranii or tapping of the brain, ought to be performed to reduce its bulk. This operation has been successfully performed in several cases, which I have recorded in another work,—*The Physician's Vademecum*, 11th edition, 1837.

Premature rupture of the membrane before the orifice of the womb is fully dilated by labour pains, will greatly retard labour, and induce excessive pains, and may excite inflammation, gangrene, and death.

The *treatment* is the same as for rigidity of the genitals, already described.

Rigidity of the membrane may retard labour.

Treatment.—When the orifice of the womb is fully dilated (see *Natural Labour*), the membrane may be ruptured with the fingers, a probe, or any sharp instrument.

Inordinate distension of the uterus by the amniotic fluid.—This disease is caused by *hydramnios*, *dropsy of the amnios*, or *redundancy of the waters*, &c. which distends the uterus, and renders it inert.

Treatment.—Puncturing the membranes, and the ergot of rye are the best remedies.

Inertia, or want of contractile power, or labour pain in the womb, may also be induced by bad health, tedious, or long continued labour, which will depress the powers of life, and if allowed to continue for two or more days, or too long, may terminate by death.

The term *false waters* is applied when there is a collection of fluid between the chorion or amnios, or the decidua and uterus. In such cases, there may be a discharge of one or more pints of fluid, any time after the third month of pregnancy until the period of delivery. In such cases the decidua is not ruptured, the real water collects in a bag, as at the full time in natural labour, and is discharged in the manner already described. (See page 177).

Slight or irregular action of the uterus—Delicacy of constitution.—Cordials, wine or spirit and water, warm drinks, and ergota or ergot of rye, when the orifice of the womb is fully dilated, the crown of the head, or the breech, knees, or feet of the infant presenting, and the pelvis capacious or natural. A scruple of the ergota may be administered every quarter of an hour, in powder, until three are given; or a \mathfrak{z} iss may be boiled slowly in a covered vessel in \mathfrak{z} ijj of water for a quarter of an hour, strained, mixed with milk, sweetened with sugar, and divided into three doses. This medicine, if good and properly prepared, is as efficient in promoting parturient action, as opium is in inducing sleep.

The tincture is composed of \mathfrak{z} ijss of the ergot and Oj of proof spirit macerated for four days, and strained—dose M xx— \mathfrak{z} ij two or three times.

This preparation generally fails.

Mr. Battley has assured me that proof spirit is not a proper solvent, and he has substituted a liquor or aqueous solution, of which the dose is M. xx— \mathfrak{z} ., as above. See also *Universal Pharmacopœia of Hospitals by Author*, 3rd edition, 1839.

Mental depression, as fear, despondency, &c., retards parturition, and

is to be obviated by consolation, and inspiring confidence in the SUPREME BEING, who protects the majority of women on the face of the globe without human interference. Warm drinks and cordials are also beneficial.

Painful, partial, and spasmodic contractions of the uterus may continue for hours and days before delivery. These are common to nervous, hysterical, and excitable women.

Many authors likewise contend that the mouth of the womb may contract strongly on the neck of the infant, (Capuron, Gardien, Hatin, &c.)

Treatment.—Anodynes, morphia, antispasmodics, stimulants, dietetic and medicinal, anodyne liniments to the abdomen, belladonna ointment to the os uteri—℞. Ext. Belladon., ʒj; Adipis ʒj. M.

Some obstetricians advise incision of the margin of the uterine orifice, and others to the use of the forceps in such cases, but the former remedies are preferable, and mostly succeed in affording relief.

I may here observe, that the human foetus may present the crown of the head, the feet, knees, or breech, and be born alive without any artificial assistance, (see page 25); but almost every part of the head, face, neck, and trunk, may descend, or present, and cause difficult or tedious labour, unless aided by the hand or instruments. In fact, almost every part of the infantine body, from the crown of the head to the sole of the foot, may descend or present during labour, and this has led many others, as well as myself, to propose a vast number of species and terms of parturition, which I now purposely omit and simplify in this work, although I briefly describe the whole in the text.

A concise, yet comprehensive notice, may be instructive to the student and junior practitioner.

Presentation of the head.—Every part of the infantine head, besides the vertex or crown, the natural one, may descend or present in the maternal pelvis, and cause tedious, difficult, and preternatural labour. It is for this reason that I have measured every part of the head in *plate 2, figs. 2, 3*, and given the exact lengths, as compared to those of the pelvis of the mother. (See *plate 1, figs. 2, 3*; *plate 2, fig. 1*.) The management of every possible presentation of the head, face, neck, body, and limbs of the foetus, will be concisely described in these pages. When the head is viciously placed at the superior entrance of the pelvis, it is to be rectified with the hand, long forceps, or lever, or perforated, according to British authors; while the French and others advise the feet to be brought down by the operation of version or turning. (See *Version*, and p. 28.) When the head is impacted, or jammed, or locked in the cavity or inferior strait of the pelvis, it may be extracted with the above instruments, or perforated. (See *Forceps, Craniotomy*).

The causes of preternatural presentations of the foetus during parturition are very numerous.

Causes.—Some ascribe them to, 1. An excessive development of the womb; 2. An obliquity of that organ; 3. To an excessive quantity of water or amniotic fluid; 4. To the small size of the infant; 5. To its movements in the womb; and, 6. To the movements and attitudes of the mother during pregnancy. Whether these causes be satisfactory or

not, all experienced obstetricians must admit that every woman has a different labour if she bear twenty infants; and, likewise, that her sensations and feelings during each pregnancy are very different, and this is to be expected, when we bear in mind the states of health, happiness, misfortune, season; aliment, &c. &c. which influence conception, pregnancy, and parturition. It is also equally well known, that the most unfavourable presentation of an infant at the commencement of parturition, may be suddenly altered to a favourable one, by nature alone, though this is seldom the case; for example, an infant has alternately presented by the chest, back, side, breech, knees, feet, or head, in a few minutes or hours, but such changes of position generally occur only before the rupture of the membrane and escape of the water, and seldom afterwards, (see *Version*, and *p. 28.*) I have already observed, that every part of the head and face may present, and these I shall now describe.

Face Presentations.—The face may present with the chin turned to the pubis, or to either side, or to the back of the woman. (See *plate 22, figs. 2, 3; also Forceps and Craniotomy.*)

Face presentations are difficult, and require the aid of art, unless when the forehead is towards the sacrum, the pelvis of the mother is large, and the head of the infant small; but when the face is towards the pubis, delivery is extremely difficult, if not impossible, without medical assistance, unless the head be small or premature.

The indications are, to rectify the position of the head with the hand, forceps, or lever; and if the operator fail, he should open the head, or craniotomise, according to British obstetricians, or perform version, according to the continental. The real object is, to adjust the head to the pelvis, as in natural labour, if possible. (See *plates 29, 30, 33.*)

While writing these pages, I was called by Dr. Griffith, of Lower Belgrave Street, Belgrave Square, to a case, in which the face was towards the pubis, the woman in severe labour for fifty hours, no descent of the head for twelve hours, and craniotomy became indispensable. It required seven hours for its successful performance. The patient was above thirty years of age, slight figure, pelvis small, and infant very large. About the same time, I was called by Mr. Peplow, surgeon, of Tottenham Court Road, a former and zealous pupil of mine, to a first case nearly similar. There was no possibility of employing the forceps or lever, so great was the impaction of the head; the motion of the infant had not been felt for nineteen hours, and the action of its heart could not be discovered by auscultation; all labour pains had ceased for six hours, and the woman was sinking. The operation of craniotomy was performed, occupying an hour and a half; there was great difficulty in lowering the base of the skull, which was effected with the craniotomy forceps, the perineum was gradually dilated, in imitation of natural labour; ergota was now given, the shoulders were adapted to the pubis and sacrum, but did not descend during the labour pains, and were elevated towards the maternal abdomen, the perineum being properly supported at the same time, and were slowly extracted, as also the placenta: the woman recovered. (See *Natural Parturition and Craniotomy.*)

1. When the face is turned to the pubis, nature may rarely deliver and time and patience are necessary; but if she fail, the obstetrician should, if possible, press the face upwards and sideways in the absence of pain, or apply the lever on the occiput, or back of the head, to depress it, while he pushes up the face with the fingers.

When the face is low down and firmly wedged in the pelvis, the lever may be placed over one cheek; and the chin, brought if possible, to emerge from under the pubis. In this last case, the mouth should be closed with the index finger while passing under the arch of the pubis.

2. When the chin is opposite to either side of the pelvis, the face ought to be turned into the cavity of the sacrum with the hand, forceps, or lever, as in natural labour, (see *plate 14, fig. 3*), when it can be accomplished.

3. When the chin is turned to the sacrum, which rarely happens, the treatment is the same as in the last case; and if this fail, version or craniotomy must be employed.

Presentation of the ear, neck, forehead, temple, or occiput, may be rectified with the hand, forceps, or lever, in the absence of labour pain, or version may succeed, and if this fails craniotomy must be performed.

Presentations of the trunk or body.—Every part of the body or trunk, from the nape of the neck, or base of the skull, to the breech or pelvis of the foetus, may be the descending or presenting part.

The trunk of the foetus presents four regions, the *anterior, thoracic, or abdominal*; the *posterior, or dorsal, and two lateral*. In all these presentations, version or turning will be necessary at the termination of pregnancy. (See *Version and Spontaneous Version*.) Whether the upper, middle, or lower part of the chest or back, shoulder, arm, side, abdomen, navel-cord, hip, &c. present, version or turning will be required, and the sooner it is performed the better. (See *Version p. 211*.)

Anterior surface of the foetus.—This comprises the face, the front of the neck, the chest, and the abdomen. These parts are easily distinguished in most cases. The face is recognized by the coronal or sagittal suture, the nose, mouth, and chin, the orbits and cheeks. These parts are easily detected, unless swollen by congestion or inflammation; and in such cases, they are often discovered with difficulty, as I have frequently experienced.

The anterior aspect, or front of the neck.—This part is generally ascertained by the adjacent position of the chin and superior part of the chest, and ordinary length of the neck; but there are exceptions.

The *chest* is mostly detected by the presence of the sternum, or breast-bone, the clavicles, or collar-bones, the ribs, and the intercostal spaces, or spaces between these. The abdomen is soft, and bounded by the sternum, ribs, and pelvis; and has the umbilical cord or navel-string inserted in its middle or centre. But all these presentations are often very much obscured by the swelling of the presenting part during tedious labour, so that the most experienced obstetricians are frequently embarrassed in arriving at correct conclusions.

Lateral aspects of the foetus.—These comprise the sides of the head, neck, shoulders, arms, and fore-arms, sides of the chest and loins. For the modes of detecting them, see pp. 21, 22, and as follows.

The *side of the neck* may be detected, in most cases, by the presence of the ear and shoulder. The shoulder is easily discovered by its roundness, the clavicle or collar-bone, in front, and the scapula or shoulder-blade behind, as well as the presence of the axilla or armpit. (See p. 23.)

The *side of the chest* is easily recognized by the ribs, intercostal spaces, shoulder and abdomen; as well as by the spinous processes of the vertebræ, posteriorly.

The *posterior region of the fœtus* comprises the occiput, back of the neck, dorsal, and lumbar spines.

The *occipital region, or back of the head*, is detected by the posterior fontanelle, the lambdoidal suture, the occipital protuberance, and the neck, when they can be felt.

The *posterior aspect, or back of the neck*, is characterised by the spinous processes of the cervical vertebræ, and by the shoulders. The latter have been already described, (see p. 23.)

The *loins* are characterised by the spinous processes of the lumbar vertebræ, the softness and want of resistance at each side of the spine, the presence of the inferior or false ribs superiorly, and of the hip-bones inferiorly.

Lastly, the *breech, knees, and feet of the infant* may present, (see pp. 24, 28, 30,) and labour be terminated by nature alone, as when the crown of the head presents in natural cases; and hence the European continental writers on obstetricy, class these cases among natural parturitions. (*Vide ante*, p. 28.)

Breech Presentations.—The breech, or inferior extremity of the infantine pelvis, may present in the same directions as the knees and feet. It is recognized by a large round tumour, softer than the head, and harder than the abdomen, having three bony prominences, formed by the coccyx posteriorly, the ischiatic tuberosities laterally, and in the centre there is a depression or cleft, in which we find the genital organs and anus, as well as two columns generally formed by the thighs, and a discharge of the meconium.

When the breech presents at the outlet of the pelvis, one hip is to be turned to the pubis, by means of the fingers passed over the thighs, or by the blunt hook, fillet, bandage, or forceps inversely, (see *plate 17, fig. 1.*) When it presents at the brim, or superior entrance of the pelvis, we must either pass up the hand to bring down one or both feet, or if the brim is filled by the infantine pelvis, we should press it up, if possible, or allow it to descend into the cavity of the pelvis, and then extract it by the same means as when at the outlet.

In all cases, in which any part of the body of the infant presents from the neck to the breech, version is necessary; and if this cannot be accomplished, then decollation, decapitation in neck cases, or evisceration of the thorax, or abdomen, fracturing, at the same time, and separating the spine by means of the blunt hook, or crotchet, and dividing the trunk into two halves, should be resorted to, sooner than allow the woman to die undelivered. (*See these terms in Index.*)

In cases of decollation or decapitation, the trunk of the infantine body may be extracted first, and the head adapted to the superior and

inferior axes of the pelvis, with the hand, forceps, long forceps, or lever; and if these fail, let pressure be made, by an assistant, on the abdomen and uterus, and the head fixed and perforated, and broken down with the craniotomy forceps, (see *Craniotomy*); but never brought down in its full size, or in a wrong direction, as delineated in Smellie's original plates, and advised by some moderns.

In all transverse cases, version or turning should be performed, if possible; but when it cannot be effected, incisive operations must be resorted to, for the purpose of saving the life of the mother; and these can be accomplished, in most cases, with perfect safety, by any well educated medical obstetrician.

Presentations of the back, chest, shoulders, arm, abdomen, navel-cord, hips, sides, or any part of the infant, from the neck to the breech, require the operation of version or turning, that is bringing down the feet, as the infant is across, and cannot come into the world unless by the head or feet, (see plates 27, 28.)

Presentation of the funis, or navel-cord.—When the navel-cord descends, and is the presenting part, it may be compressed, the circulation through it stopped, and consequently the infant destroyed, (see plate 8, *fig. 1, b, c*; and p. 136; plate 29, *fig. 1.*)

Treatment.—When the cord presents with the head, breech, knees, or feet, it should be pushed up into the womb, in the absence of labour pains, if practicable; and in transverse cases, hooked on an upper or lower extremity, while the operator introduces his hand to bring down one or both lower extremities, and perform the operation of version. This will be urgently required, should the pulsation of the cord become feeble, and the infant be threatened with death. When the cord is too short, or when too long, (see p. 137, plate 8, *fig. 1.*) and is twisted round the neck, body, or limbs of the infant, as soon as the head is born, there may be separation of the placenta, inversion of the womb, or laceration of the navel-string at the abdomen of the infant, and apoplexy of the latter.

Podalic version is preferred to cephalic, because the latter can rarely be accomplished, even in the absence of labour pains.

Operation of Version or Turning.—Version or turning is necessary when the infant presents transversely or across, and is much more easily performed before the escape of the water, than afterwards, as in the latter case, the womb generally contracts tightly and forcibly on the foetus during each pain, and totally prevents the introduction of the hand, in general. The mouth of the womb must be sufficiently dilated or dilatable to admit of the passage of the hand before version is attempted; and the labour pains must be absent or suspended, by large and repeated doses of the sedative preparations of opium, or other means, before the operation is commenced.

All means calculated to favour the dilatation of the womb, are employed in France, Continental Europe, America, and India, as warm baths, fomentations, fumigations, emollient vaginal injections, an ointment of belladonna; but these are scarcely ever, or very seldom, employed in this country. The object of the obstetrician is to introduce his hand into the vagina and womb, rupture the membrane, lay hold of the foot

or feet of the foetus, and bring it or them down into the vagina, and then adapt the largest parts of the foetus to those of the mother.

The position of the woman may be on the side or back, near the edge or foot of the bed, or in the prone posture, on the elbows or knees, (Denman.) The situation of the patient cannot alter the position of the infant, and it should always allow the operator the free and dexterous use of his hands. The woman may be placed on either side or back, or across the bed, her head and shoulders being properly supported, but always as near as possible to the edge of the bed; the bladder and rectum should be evacuated, if possible, and labour pains absent, before the operation is attempted.

The lower extremities of the infant may be situated superiorly, inferiorly, anteriorly, posteriorly, or laterally, as regards the pelvis of the mother. (See *plates 25, 26, 27, 28, 31.*) The lower limbs are extracted in preference to bringing down the head, as this could scarcely be properly adapted to the pelvis, as in natural labour, although I have more than once succeeded in accomplishing it. The head has, also, been brought into the natural position by pressure on the abdomen, by Wigand and Velpeau. When this cannot be accomplished in the absence of labour pain, the head should be pushed up into the iliac fossa, or inner surface of the hip-bone, pressure made on the abdomen with the other hand, or by an assistant, the womb inclined to the side, and the foot or feet brought down. Whichever operation is attempted, whether the cephalic or pedal version, the largest parts of the foetus must be brought through those of the mother. (See *Mechanism of Parturition*, p. 25.)

When the feet, knees, or breech are lower in the cavity of the pelvis than the head, they should be drawn down and adapted to the widest part of the pelvis, and traction made in the directions of the axes of the brim cavity and outlet of the pelvis, (see *plate 2, fig. 1*); and if there be no labour pain, the ergota may be given, friction made on the abdomen, or the delivery accomplished with the hand, forceps, or blunt-hook, as in head or breech cases, uterine contraction or labour pains being previously excited in all cases, if possible.

When the infant is transverse to the outlet of the pelvis, the orifice of the womb dilated sufficiently to allow the hand to pass through it, or dilatable, the labour pains should be suspended by a full dose of the muriate of morphia, as 3ss. or m. xl. of the sedative solution of liquor of opium. As soon as the pains have ceased, which may be in an hour or two, or after an additional quantity of morphia, the obstetrician should form a correct idea of the position of the feet, and introduce the hand, with which he can more readily seize them. After having lubricated his hand, wrist, and arm with pomatum, lard, fresh butter, or olive oil, he is to bring the points of the fingers in contact, and gradually introduce his hand in the form of a cone, through the vagina into the uterus, pressing the abdomen with the left hand at the same time, so as to depress the womb, and pass it slowly on the side of the foetus until he reaches and lays hold of one or both feet, which he is to bring down into the vagina. (See *plate 21, fig. 3*; *plate 23, figs. 1, 2, 3*). Whenever pain returns while the hand is being passed through

the os externum, vagina, or uterus, the operator ought to cease his efforts, and flatten the hand until the pain has ceased. There would be danger of rupturing the vagina or uterus, by persevering in attempts to introduce the hand, when labour pains are strong and frequent.

It is to be remembered, that the vagina or external genital aperture, is not dilated in transverse labours, because there is no pressure on it, and that great pain will be caused to a primiparous woman, or one who is in labour for the first time, or one who is very young or very old. In some cases, an hour may elapse before the hand can be introduced into the vagina, in others it may be passed in a moment. It is, however, to be borne in mind in all cases in which the external genital aperture has not been gradually dilated by labour-pains, the obstetrician must strictly imitate nature both in manual and instrumental operations, and gradually bring down the presenting part through the vagina, and external genital aperture during each labour-pain, and when this ceases allow the presentation to recede a little as in natural labour. Traction must be repeatedly made in this manner for an hour or more, to carefully dilate the perineum as in natural labour, forceps, transverse, and craniotomy cases.

The foetus should be extracted slowly, especially if there is no labour pain, and so as not to leave the cavity of the womb empty, as the organ would afterwards contract, and cause the disease termed hour-glass contraction. It is also necessary, in extracting the foetus, to attend to its natural flexions, for otherwise the operation will be difficult, and may cause dislocations and fractures.

When the hand is passing towards the feet, the navel-cord should be loosened when passed round any of the limbs, and sometimes must be divided to finish the labour.

When the hand has passed through the external genital aperture, it must be slowly conducted to, and through the os uteri, the membrane ruptured if entire, the hand passed along the side, thigh, and leg of the infant, until it arrives at the feet. When the feet lie together, they are to be firmly grasped in the hand, (see *plate 21, fig. 3*); but when they are distant from each other, it will be sufficient to seize on, and bring down one foot only. When the operator has grasped the foot or feet, he is to bring it or them very slowly into the vagina, in an oblique direction, to the external genital aperture, until one hip arrives in the concavity of the sacrum, and the other towards the pubis—as by this position the widest part of the infant is adapted to the widest part of the outlet of the pelvis, (see *plate 23, figs. 1, 2.*)

Dr. Radford, of Manchester, advises one lower extremity only to be brought down, with a view of diminishing the bulk of the cone which the foetus now forms in passing through the pelvis. This may be done in some cases, but there is much more danger of injuring the ankle, knee, or hip-joint, when traction is made by one instead of both extremities.

When one limb descends, or is extracted, the hand should not be introduced to bring down the other, as it will be bent on the abdomen, or back, and will come down with the trunk.

This is in imitation of the passage of the hips of the infant in natural

parturition, but in an inverse sense, (see *plate 17, figs. 1, 2*). The toes ought not to be turned to the back or abdomen of the mother, as is generally recommended, (see *plate 23, figs. 1, 2*). When the toes are towards the back of the mother, the long diameter of the infant's pelvis will be in relation to the shorter (transverse) of that of the mother, and much difficulty will be encountered in extraction, unless the infant is premature, or very small.

When the feet of the infant have passed through the external aperture of the genitals, they are to be wrapped in a napkin, and drawn in a line from the back of the woman towards her abdomen during the labour pains, that is, in the course in which the head passes in natural labour, (see *plate 2, fig. 1*; *plate 16, fig. 1*; *plate 23, figs. 1, 2*.)

Whenever the labour pain ceases, the obstetrician must also cease making extraction in imitation of natural labour, and not cause the delivery to be entirely artificial.

If the labour pains become weak, or cease altogether, as in tedious cases, a judicious exhibition of the ergota or secale cornutum will be necessary, and may be combined with spirit or wine, properly diluted, and in moderate quantity.

Due care must be taken not to injure the ankle, knee, or hip joints, and not to fracture the bones of the lower extremities, especially when extracting one of them only. In some cases, a ligature may be applied above the ankle.

As soon as the hips of the infant have arrived at the external genital aperture, the lower one next the perineum or back of the woman is to be raised with the hand, and the perineum properly supported, as in natural parturition, (see *plate 17, figs. 1, 2*.) The operator ought to wait for labour pains, and when they return make his efforts; but should the pains have entirely ceased, the infant must be extracted very slowly, and the woman allowed several respites between each artificial effort. When the hips of the infant have passed through the os externum, one is towards the pubis, and the other towards the back of the mother. The loins and inferior part of the chest are now to be extracted in an oblique direction to the external genital fissure, until the funis or umbilical cord reaches this last part, (see *plate 23, figs. 1, 2*.)

A small portion of the funis is now to be drawn out, to diminish the chance of its compression by the os externum, to prevent the separation of it from the body of the infant, or from the placenta, or of the latter from the uterus; and the remainder of the operation of version ought to be completed as speedily as it can be accomplished with safety.

When the pulsation of the navel-cord continues, there is no occasion for haste, as the infant is still safe. The abdomen of the infant should now be turned in an oblique direction to the os externum, or external genital orifice, and finally towards the back of the mother, (see *plate 23, fig. 3*.)

The infant's body may be extracted without much difficulty, if drawn down from side to side, and also from below upwards, (see *plate 2, fig. 1*; *plate 16, fig. 1*; *plate 23, fig. 3*; *plate 24, fig. 1*.)

The arms of the infant are now placed on each side of its head, and

towards the hips of the woman. The forehead lies towards the sacrum, and the occiput towards the pubis, (see *plate 24, figs. 1, 2, 3*).

Were the back of the infant turned to that of the mother, it would be difficult, if not impossible, to extract the arms, as the back of the elbow would be pressed into the cavity of the sacrum in any attempt to bring it down. If one arm was towards the pubis, and the other towards the sacrum, there would also be much difficulty in extracting it, and great danger of dislocating or fracturing some part or point of it.

In either of the last presentations, and in all cases at the full time, the abdomen of the infant should be turned to the back of the mother, whether the feet are brought down with the hand, as in version, or whether they come down spontaneously, as in pedal or footling cases, (see *plates 23, 24*.)

But this rule need not be followed in cases of premature labour, before the sixth month, as the infant is comparatively small, and may be expelled in the positions above objected to.

The compression of the soft parts on the navel-cord is more or less considerable, may arrest its circulation, and destroy the infant; and for this reason the delivery ought to be accelerated in the manner above mentioned.

The body of the infant should be supported on the left arm, and raised towards the abdomen of the mother, in the axis of the outlet of the pelvis, or in the line in which the head passes in natural labour. (See *plate 2, fig. 1*; *plate 16, fig. 1*; *plate 24, figs. 1, 2*.)

Two fingers of the right hand are passed over the right shoulder of the infant, and along the arm to the elbow joint, and the elbow is slowly bent and extracted, the perineum being at the same time properly supported with the left hand. The body of the infant is now drawn to the side on which the arm is extracted, and the other arm brought down in the manner now described. (See *plate 24, figs. 2, 3*.)

Some advise the thumb to be introduced, first under the arm, and then the index and middle fingers of the right hand over the shoulder, as above stated; next to bend the elbow, and bring the fore arm into the cavity of the sacrum, at which time the body should be inclined towards the left side of the woman, which will render the extraction of the arm much easier; and while this presents by the elbow, the perineum must be properly supported with the left hand of the obstetrician. (See *plate 24, fig. 1*.)

The relative position of the infant's head and the maternal pelvis to each other, now deserves great attention. The face is in the cavity of the sacrum, the chin resting on the os coccygis, or perineum, and the occiput is under the pubis. (See *plate 25, figs. 1, 2*.)

The body of the infant must now be supported on the left arm under the breast. (See *plate 25, figs. 1, 2*.) The index and middle fingers of the right hand are placed on each side of the neck, close to the base of the skull, and the index and middle fingers of the left hand are placed on each side of the nose to draw down the face, when the index finger of the left hand is introduced into the mouth, to depress the chin on the chest, and the face, forehead, and crown of the head;

while the back of the infant is raised towards the abdomen of the mother with the left arm and right hand. (See *plate 25, fig. 2*).

The left superior extremity is to be extracted by the same manœuvre as the right, but in an inverse sense. The fingers of the left hand should be introduced as before, and the body drawn to the left, (see *plate 24, fig. 1*), and supported on the right arm; but when the left arm of the infant is extracted, the face and head are to be managed as described in the last paragraph.

Some advise the introduction of the right hand after the extraction of both superior extremities, and to place two fingers on each side of the nose, while the index and middle fingers of the left hand are placed on the neck close to the occiput, and thus flex or bend the head upon the chest. If the index finger of the right or left hand, according to which may be used, is placed in the mouth of the foetus, and the middle finger on one side of the nose, and the third or ring finger on the other, the face, mouth, and chin may be considerably depressed, and the head will readily escape through the vulva, the body being elevated, and the back of the infant brought nearly in contact with the abdomen of the mother. The perineum is to be supported with the left hand, while the chin, face, forehead, and head are passing over it and escaping through the external genital aperture. (See *plate 15, fig. 1*.) The extraction of the head may be accomplished by either method, but I have almost always found the first the easiest and best. While its being effected, the operator must be in the erect or bent position, and not in a sitting posture. Pressure may be made externally on each side of the coccyx, or the index finger of the left hand introduced into the rectum, for the purpose of pressing the forehead or face upwards from the back of the woman towards the abdomen, which often greatly assists in facilitating the birth of the head. I believe I was the first physician in this kingdom to propose the first operation, (see *p. 12*), and I have also frequently performed the second with much advantage.

When the head is disproportionately large, hydrocephalic, or the scalp congested, or a tumour attached to it, the forceps or craniotomy may be required. In either operation, the traction should be made in the axis of the cavity or outlet, (see *plate 2, fig. 1, plate 31, fig. 2*; see also *Forceps and Craniotomy*.)

Should the body when born be forcibly separated from the head, the latter may be extracted with the forceps or lever, in its natural state, the base of the skull now presenting, (see *plate 2, figs. 2, 3; plate 25, figs. 1, 2*), or the head may be reduced in size by craniotomy, if necessary.

This manœuvre enables the obstetrician to extract the head from below upwards, as in natural parturition; while those unacquainted with the mechanism of labour, suppose that when the body is born, the head ought to follow rapidly, and they make traction towards the back of the woman, pulling the chin against the sacrum or os coccygis, instead of upwards towards the pubis, and thus inevitably fail to effect delivery.

As soon as the head begins to enter the external genital fissure, the obstetrician should proceed slowly, and support the perineum by extending the palm of the left hand and fingers across it, in a line from one tuberosity of the ischium to the other, (see *plate 15, fig. 2*), the back of the infant being finally brought near the abdomen of the mother.

When the infant is extracted by the feet, the placenta separates in most cases, and speedily and easily follows, and is to be managed as in the third stage of labour already described, (see p. 183.)

On carefully comparing the process of natural parturition and the manœuvres made in performing the operation of version or turning, they will be found exactly similar, but in an inverse sense. In both, the largest bulks of the infant's head, shoulders, body, and inferior extremities, are adapted with mathematical precision to the most capacious parts of the pelvis, or bony cavity through which they have to pass. The same rules as in version also apply when the breech, knees, or feet present, and when the head or body of the infant is extracted by obstetric instruments through the natural passages, (see pp. 25, 28; *plate 2, fig. 1*; *plates 14, 15, 16, and Natural Parturition*, pp. 25, 28.)

When the arm presents it may be drawn to one side, while the obstetrician introduces his hand to turn and bring down the feet and body of the infant, in the manner already described, (see *Version*.) There never can be an occasion to separate the arm from the body of the infant, unless when it is so congested as to fill up the external genital aperture, and prevent the introduction of the hand; and it is never so swollen during the life of the infant as to require amputation, which could not change the transverse position of the infant to the pelvis.

In past times, and even in this century, the arm of a living or dead infant, when presenting or passing first into the world, has been barbarously twisted or cut off, as if this operation were calculated to change the transverse position of the body, (see *plate 23, fig. 2*), or facilitate delivery. I have been called to cases of these kinds, and also when the midwife had enveloped the arm with flannel, to prevent the infant from taking cold, and to expedite delivery.

I need scarcely observe, that all these proceedings were equally irrational, useless, and absurd. But such absurdities must be expected, so long as British legislators allow ignorant persons to practice medicine, on the fallacious principle of not interfering with the liberty of the people.

When the breech presents itself with the hips of the infant across the outlet of the pelvis, from ischium to ischium, (see *plate 26, fig. 4*), the blunt hook or forceps may be applied over the hips, traction being made in the axis of the outlet of the pelvis, from the back of the woman towards the abdomen. The first object is to turn one hip towards the sacrum, and the other towards the pubis, (see *plate 23, figs. 1, 2*).

The index and middle fingers may be placed over one hip, or a silk handkerchief may be passed in some cases over one or both hips, and between the thighs, and traction made in the proper direction.

The various presentations of the breech, knees, and feet, have been already described in the account of *Natural Parturition by the Abdominal extremity of the Fœtus*, p. 28, and also hereafter; and are here

noticed in a summary manner, to connect the subjects under consideration.

Fillets or bandages were formerly used for this purpose, but are now seldom employed. They were applied round the ankle, wrist, knee, arm, under the arm, and round each thigh, in breech cases; but manual or instrumental aid is now generally preferred, (see *Version, Forceps, Blunt Hook.*)

The operation of version or turning is so highly important, as well as those in which the forceps, lever, or blunt hook, which may be termed artificial hands, and are much smaller than the natural, however small, (see *plate 40*), together with all incisive operations, except the Cæsarian section, or gastro-hysterotomy, as well as vaginal hysterotomy and symphyseotomy, that I hope I shall be excused for giving a summary of them very minutely; and if even I may be guilty of slight repetition. In all these operations, as well as craniotomy or embryotomy, the Cæsarian section excepted, traction ought to be made as in natural parturition, through the brim, cavity, and outlet of the pelvis, in the proper directions, (see *plate 2, fig. 1; plate 16, fig. 1; plate 31, fig. 2; plate 35, figs. 1, 2, 3.*)

I shall now give a summary of the facts relating to the operation of version or turning, partly Dr. Denman's, and principally my own.—(See “*Dr. Denman's Aphorisms, or the Obstetrician's Vademecum.*” Edited by Dr. Ryan, ninth edition, with plates. London, 1836. E. Cox, and Burgess and Hill.

SUMMARY OF VERSION.—TURNING.

Version or turning is most easily performed when the os uteri is fully dilated, the membrane unbroken, or the water lately discharged, and before the womb is firmly contracted on the infant.

When the membrane breaks in the beginning of labour, the os uteri being little dilated, (see *Premature Rupture of the Membrane, p. 206*).

When the mouth of the womb has been fully dilated, the membrane broken, and the water long discharged, the uterus being at the same time strongly contracted, and the body of the infant jammed at or into the superior aperture of the pelvis, (see *plate 21, figs. 2, 3; plate 25, fig. 3; plates 27, 28*).

When, together with any of these circumstances, there is a great disproportion between the size of the head of the infant, and the dimensions of the cavity of the pelvis; and also when any part of the head except the crown presents, as the side, back, temple, face, neck, or any part of the body from the neck to the breech.

The operation of version or turning cannot be performed with safety while labour-pains or uterine action continues, and to allay this, bleeding, in cases of full subjects, and when this fails, a large dose of morphia, or the sedative solution of opium, ought to be given, so as to tranquillize the action of the uterus.

If these means fail, we may nauseate with tartarized antimony; and if uterine action return after the use of this remedy on the introduction of the hand, and that the infant is dead, the tobacco enema might, I imagine, be employed.

I was once requested to visit a patient, by Dr. Griffith, professor of Midwifery at the Westminster School of Medicine, who had employed all means except the tobacco enema. There was no uterine action, yet neither of us could perform the operation of turning or version, so powerfully was the womb contracted, or even introduce the hand into the organ, although the woman was evidently in a dying state. We agreed to eviscerate the chest and abdomen, which was commenced by Dr. Griffith. When this was partly performed, the late Dr. Ley, Professor of Midwifery at St. Bartholomew's School of Medicine, joined us in consultation, and he, after great difficulty, succeeded in bringing down the feet of the infant, while the patient was moribund; but the woman died in a few hours afterwards. She had been three days in strong labour, the arm presenting, although the midwife repeatedly declared, most positively, that she had only been one.

In two similar cases, which I treated alone, I opened the chest, eviscerated it and the abdomen, divided the spine with the crotchet, and the distal or far side of the body, and effected delivery, (see *Manual of Midwifery*, first, second, and third editions. 1828-30-31—(*plate 37, figs. 3, 4*). Such an operation should be performed, in my opinion, on a dead foetus, sooner than allow the mother to die undelivered, in all cases of transverse presentations, or cross births. When any part of the head besides the crown presents, or the neck, craniotomy, or decollation may be performed, as already described, (see p. 210, and *plate 37, figs. 1, 4*.)

When the neck is divided by means of the crotchet, blunt hook, or scalpel, (see *plate 37, fig. 1*), there will be no difficulty in adapting the base of the skull to the long diameter of the cavity or outlet of the pelvis with the hand, forceps, or lever, or in extracting it in the proper direction, by fixing the crotchet on the edge of the occipital foramen, under the mastoid process of the ear, or in the socket of the eye: and when the head is too large, in reducing its bulk by craniotomy. As to sawing the neck across with Hey's saw, as once recommended, it is, in my opinion, highly dangerous and impracticable, as the womb would be inevitably wounded. This might be avoided by having a blunt hook at the end of the saw; but there is so little difficulty in dividing the neck with the crotchet, scalpel, or blunt-hook, that I do not suppose any other instruments to be necessary. I have succeeded by drawing down the neck with the blunt-hook, crotchet, or finger, so low that I separated it with a scalpel from the head, in premature births, very easily, and then readily extracted the head or body by the neck.

The external genital aperture is then to be dilated with the fingers reduced into a conical form, acting with a semi-rotatory motion of the hand, (see p. 212).

The external genital aperture should be amply distended before the hand is carried farther, or its contraction round the wrist will be an impediment in the subsequent part of the operation.

When the hand is passed through the external genital aperture, it must be slowly conducted to the os uteri or mouth of the womb, which being wholly or sufficiently dilated, the membrane is to be broken, by

perforating it with a finger, or by grasping it firmly in the hand, or twisting it, as already advised.

The hand must then be passed along the side, thigh, and leg of the infant, until the operator arrives at one or both feet.

Before we begin to extract the infant, we must be assured that we do not mistake a hand for a foot.

The feet must be brought down, with a slow waving motion, into the pelvis; when we are to rest and wait till the uterus begins to contract, still retaining them in our hand. (See p. 213).

When the action of the uterus comes on, the feet are to be brought lower at each return of pain, till they are extracted through the external orifice, and the labour may then be finished, partly by the efforts of the mother, and partly by art. (See *plate 23, figs. 1, 2*).

The difficulty in the management of the cases which require version, depends upon the degree of contraction of the uterus, and upon the distance or awkward position of the feet of the infant, but chiefly upon the former circumstance. (See p. 213).

The uterus is in some cases contracted in a globular, and in others in a longitudinal form.

It is always easier, with an equal degree of contraction, to turn the infant when the uterus is contracted in a globular, than in a longitudinal form. The contraction should be allayed if possible. (See p. 212).

When we are called to a case of the first kind, it is better not to form, or to give a hasty opinion, nor to attempt to deliver the patient immediately, but to deliberate upon it, and then to make a second examination.

If the second examination should confirm our first opinion, we may prepare for the operation.

We shall be able to judge in what part of the uterus the feet of the infant lie, if we consider whether it be the right or left hand which presents, which may be known by the direction of the thumb, and of the palm of the hand. (See *plate 21, fig. 2*).

But the contraction of the uterus is the principal difficulty to be surmounted, and the danger in turning the infant is in proportion to the difficulty.

The danger in turning an infant when there is a strong contraction of the uterus, is that of rupturing the organ, which may be followed by profuse hæmorrhage, or instant death.

The contraction of the uterus is of two kinds. First, the permanent contraction, in consequence of the water having been long drained off, which may occur when there has been little or no pain.

Secondly, the extraordinary contraction arising from the action of the uterus, returning at intervals, and always attended with pain.

The hand must be introduced with a degree of force sufficient to gradually overcome the permanent contraction of the uterus, or the operation could never be performed.

But if we were to attempt to overcome the extraordinary contraction, it must follow, that we can or cannot overcome it.

In the first instance, we should be in danger of rupturing the uterus; and in the second, the hand would be so cramped, and we should be utterly unable to proceed with the operation in many cases.

The deduction is therefore clear, that we ought not to proceed in our attempts to turn the infant while the uterus is acting with violence; in fact labour pain should be always absent. (See p. 212).

The action of the uterus is rendered more frequent and strong by the generally increased irritability of the patient, and also by the introduction of the hand.

Before we attempt to deliver, it will be prudent to endeavour to lessen this irritability, in many cases, by bleeding, by clysters, and by a sedative preparation of opium or morphia, which to answer this purpose, should be given in two or three times the usual quantity.

The sedative preparations of opium should always be preferred, as common opium or its tincture contains narcotine, and often excites pain instead of suppressing it. (See *Universal Pharmacopœia of Hospitals*, by Author, 3d edition, 1839).

When the opiate takes effect, and the patient is asleep, we must consider this state as extremely favourable, and proceed without loss of time to the delivery.

When the woman is under the influence of a large sedative opiate, there is scarcely any muscular action, except that effecting respiration and circulation, and consequently the uterus, which, according to most writers, is muscular, is also deprived of action. It often happens, however, that the introduction of the hand excites its action, and this is beneficial, when the hand is in its cavity, and can easily seize one or both of the infant's feet.

But if the infant be jammed at the superior aperture of the pelvis, the hand cannot be introduced.

We must then fix our index finger and thumb in the form of a crutch in the axilla or armpit of the infant, and pushing the shoulder towards the head, and towards the fundus of the uterus, raise the body of the infant by degrees, till there be room for the introduction of the hand. (See *plate 26, fig. 2*).

If, while the hand is being introduced, we perceive the action of the uterus come on, we must not proceed till that ceases, or is abated.

The hand, when introduced, is also to be laid flat during the continuance of the contraction of the uterus, lest the organ be injured by its own action on the knuckles.

When the contraction ceases or is abated, we must renew our attempts to carry up the hand to the feet of the infant.

In this manner we are to proceed, alternately resting and exerting ourselves, and imitating natural labour, (see p. 213), until we can lay hold of one or both feet.

There is sometimes much difficulty in getting to the feet, and sometimes in extracting them, especially when the uterus is contracted in a longitudinal form.

In such cases it is often convenient, when we can reach the knees, to bend them cautiously, and to bring down the legs and feet together.

But before we begin to extract, we should examine the parts we hold,

and be assured they are the feet; and we must extract slowly and steadily.

If we hurry to bring down the feet, they may slip from us, and return to the situation from which they were brought.

We must then pass up the hand again, and grasping the foot or feet more firmly, bring them down in the cautious manner before advised.

When the feet are brought down, if there be difficulty in extracting them, the operator must endeavour to slide a noose, first formed upon his wrist, over the hand to secure the feet, by which the hazard of their return will be prevented, and the succeeding part of the operation much facilitated.

When the noose is fixed over the ankles, we must pull by both ends of it with one hand, and grasp the feet with the other, but we must not attempt to proceed hastily. (See *plate 26, fig. 1, 2.*)

When there is afterwards much difficulty in extracting the infant, it is probably owing to its body being jammed across the superior aperture of the pelvis.

It will then be proper to pass the finger and thumb, as already directed, to raise the shoulder and body of the infant towards the fundus of the uterus, with one hand, and with the other extract at the same time by pulling by the noose.

When one or both feet are within reach of the finger, the external genital aperture not dilated, but dilatable, the infant may withdraw the limb or limbs when touched, I have generally succeeded in bringing down one or both with the blunt hook, and then gradually dilating the vulva and perineum. (See *Blunt Hook.*)

When the breech of the child has entered the pelvis, we must proceed with deliberation, but there will be little further difficulty, except from the smallness of the pelvis, of which I shall speak in a succeeding paragraph. [See *Natural Parturition, by the Abdominal Extremity of the Fœtus* p. 28.]

SUMMARY OF THE PRESENTATIONS OF THE HEAD, NECK, TRUNK, AND EXTREMITIES AT THE SUPERIOR AND INFERIOR APERTURES, OF THE PELVIS, WHICH REQUIRE THE USE OF THE HAND, OR INSTRUMENTS TO ADAPT THEM TO THE PELVIS, AS IN NATURAL PARTURITION BY THE HEAD, AND ABDOMINAL EXTREMITY OF THE FŒTUS.

Positions of the Head at the Superior and Inferior Apertures of the Pelvis.—These may be direct, transverse, and diagonal.

Positions of the Trunk.—These may be anterior, posterior, and lateral.

In all transverse presentations, the head or feet are to be adapted to the pelvis, with the hand or instruments. The first indication is to turn the head, or breech, in the long diameters of the brim, cavity, and outlet of the pelvis, according to the inclination of either part.

The second indication is, to pass the hand along the lateral region of the fœtus, to grasp the feet and bring them down into the cavity of the pelvis.

Whenever the extremity of the foetus, or head, or breech, is inclined to the left side of the mother, it should be adjusted with the right hand in the proper direction, and *vice versa*.

In lateral presentations of the foetus, the hand which corresponds to that of the infant should be introduced.

In all transverse cases, the exact position of the feet should be determined before the hand is introduced, and this is easily done by examining the shoulder, arm, ribs, back, or abdomen, before the operation of version is commenced.

Presentations of the Breech, Knees, and Feet.—These parts may present at the superior and inferior apertures of the pelvis, in the same relations to it as the head. They are to be managed as described in the Section on Parturition, by the abdominal extremity of the foetus, p. 28, and on version, pp. 211, 218.

Version, when there are two or more Infants in the Womb.—When there are two or more infants in the womb, their extraction should be effected according to the preceding rules. In cases of twins, one is usually born by the head, and the other by the feet.

But the feet or heads of both, may present at the same time, or one infant may be born as far as the neck, the head jammed in the pelvis; the head of the other having also descended into the cavity of the pelvis.

In cases in which two infants are united by the chest, as the Siamese brothers, or back, as the Hungarian sisters, both must be born by the simultaneous presentation of the heads or feet.

When the feet of one infant present with the head of another, the former should be pushed up into the cavity of the pelvis in the absence of labour pain, or the forceps should be applied to the head.

Some authors advise the head to be pushed up, and the feet brought down. When the heads of both infants present, one should be pushed up, if possible, or the forceps, or craniotomy may be required when both are impacted.

Dr. Hamilton mentioned a case in which both heads were expelled simultaneously, in the Edinburgh Lying-in Hospital.

If the feet of both infants presented at the same time, they should be assisted as in cases of natural parturition, by the abdominal extremity of the foetus, (see p. 28), or as in version (see p. 211).

When the bodies of two or more infants are transverse to the brim of the pelvis, the feet, which are most easily laid hold of, should be brought down.

If the head of one infant is to the right side of the pelvis, and that of the other to the left, the right hand should be passed to the feet which are to the left side of the pelvis.

When one infant is partially born by the feet, as far as the neck, and the head is jammed with that of another infant in the pelvis, the latter should be pushed up into the brim, or on the iliac fossa, or the forceps may be applied to the former, or if all other means fail, perforation and reduction of one or both heads may become necessary.

A case is related by Dr. Fergusson, of Dublin, in which two heads were impacted in the pelvis, but the infant whose body was expelled to the neck, was born alive, and the other dead. This is a remarkable

fact, as the impaction of both heads was great, and the reasonable expectation would be, that in most such cases, both infants would be born dead.

Nature is by far the best obstetrician in most cases.

I attended a woman with Mr. Thorn, surgeon, of Pimlico, both arms, and one lower extremity, of whose infant, presented simultaneously with the back. It was for a long time difficult to determine whether the limbs did not belong to different infants. The inferior extremity was drawn down, and the superior pushed up into the pelvis, and delivery thus accomplished.

SPONTANEOUS VERSION OR EVOLUTION.

The term *spontaneous evolution* was first employed by Denman, and it has since been called *spontaneous version* by Murat. It is thus described, but it rarely happens at the completion of pregnancy, when the infant is full grown, though it may in premature labours.

There are two kinds of spontaneous version. 1. Spontaneous cephalic version. 2. Spontaneous pelvic version. It was stated at the Medical Society of London, a few years since, that an infant was born at the full time, with the neck presenting, and the head flattened on the back.

There are two kinds of spontaneous pelvic evolution. 1. The breech presents, while the trunk and head ascend towards the fundus uteri. 2. The shoulder, neck, side of the head, chest, or back, is violently forced down into the pelvis, the pains continue, the breech is pushed down while the former parts are receding. There are numerous authors cited by M. Velpeau, who describe the latter evolution, (see *plate 25, fig. 3*).

It would be, in my opinion, extremely bad practice, in transverse presentations, to wait for spontaneous evolution, and I feel convinced that nine out of ten women would die undelivered. Artificial version is now invariably preferred, (see pp. 208, 211).

Parturitions which Require the Use of Instruments.—There are many difficult labours in which delivery cannot be effected with the hand alone, and hence the necessity of using instruments which will readily pass when the hand cannot.

INSTRUMENTAL OBSTETRIC OPERATIONS.

The intentions in using instruments are :—

1. To preserve the lives of the mother and infant.
2. To preserve the life of the mother.
3. To preserve the life of the infant.

The instruments required to effect the first intention are: 1. The forceps; 2. The lever or vectis; 3. The blunt hook; and, 4. Fillets or bandages. The instruments required to effect the second intention are: 1. The perforator; 2. The craniotomy forceps and osteotome; 3. The crotchet; and, 4. The blunt hook.

The instrument necessary to effect the third intention, is a scalpel or bistoury with needles, and silk threads.

The forceps is composed of two branches or blades united by a joint, and these are termed the right and left hand branch, (see *plate 40*).

This instrument is applied when the head presents by the crown, or base of the skull, as in presentations of the breech, thighs, or feet, and also when the breech descends alone. It is applied over the sides of the head and ears, so that one extremity of the head, forehead, or occiput may be extracted. It is applicable to presentations at the superior and inferior apertures of the pelvis, to the latter most commonly, (see *plate 30, figs. 1, 2, 3; plate 32, figs. 1, 2*).

The causes which require the use of the forceps, are more or less disproportion between the infantine head, and maternal pelvis, (see p. 205), as also hæmorrhage, convulsions, delirium, apoplexy, &c., (see these terms).

In presentations at the superior aperture, or brim of the pelvis, the hand, forceps, or lever may be used, or version or craniotomy performed.

The position is to be changed by some means, and delivery effected, if possible.

When the head is jammed in the brim, cavity, or outlet of the pelvis, the forceps, lever, or craniotomy, is indispensable.

The orifice of the womb must be fully dilated, the membrane ruptured, the water discharged, and the head or breech of the infant the descending part.

It is advised, as a general rule, that the labour should have continued twenty-four hours before the use of the forceps, (Hamilton); or that the head of the infant should have rested for six hours after the cessation of the labour pains in the cavity of the pelvis, (Denman).

It appears to me, that no determinate period of time can be fixed, because the head may become impacted, and not advance sooner than twenty-four hours, or even six, and the pains may be so strong as to make most injurious pressure on the bladder, rectum, or other soft parts within the pelvis, and cause contusion and sloughing; or rupture of the uterus. Moreover, when the head does not advance during strong pains, or is not in the natural position as regards the pelvis, the repeated pressure of the womb by contraction, or labour pain, will destroy the infant, as well as injure the mother in the manner already stated, and under such circumstances, the obstetrician would be no more justified in waiting, in my opinion, than in a case of hæmorrhage, convulsions, or fainting.

The reader should refer to these diseases, and indeed, peruse the whole of the preceding pages, before he can offer a correct criticism on this, or any other of my conclusions.

I differ not with such illustrious physicians as Denman and Hamilton, or with preceding or contemporaneous writers, except on the grounds of science, and the interests of humanity; and from careful observation, much reflection, and some years' experience at the bedsides of parturient women, and if I err, it will be easy to confute me.

But, as a general rule, the precepts of Dr. Hamilton, and Dr. Denman ought to be implicitly followed, as most women who have regular

labour pains are delivered without instruments within twenty-four hours from the commencement of the function of parturition.

The exact time for applying the forceps must, however, be subject to the judgment of the obstetrician in any individual case. The lower the head has descended into the cavity of the pelvis, the easier it is to apply the forceps. It should never be employed unless when there is real necessity, and never on the ground of saving the time of the obstetrician.

It is not necessary, according to some obstetricians, oftener than once in a thousand cases; and, according to others, as often as once in fifty cases. I agree with the former.

There is no danger whatever, either to the woman or infant, when the forceps, or any other blunt obstetric instrument, is judiciously applied.

The bladder and rectum should be empty before the forceps, or any other obstetric instrument, can be safely employed, or even the operation of version performed.

The bladder should be evacuated with a catheter, and the rectum with an enema.

The use of the forceps is to diminish the size of the head when the pelvis is small, or the scalp is congested with blood by uterine action, or strong labour pains, and the instrument is so constructed that this object can be accomplished without danger to the life of the infant, as nature leaves the sutures of the skull unossified, so that the bones of the head may overlap each other to a certain extent when the pressure of the instrument is applied.

The same consummate wisdom is evinced in the conformation of the infantine pelvis, which is composed of fourteen bones united by cartilages, so that the breech may be compressed when it is the presenting part, to a considerable extent, without any serious danger to the life of the infant.

But if properly adapted to the pelvis, there is seldom need of using the forceps.

The shoulders of the infant also admit of considerable compression during parturition, (see p. 23.)

Thus the head, shoulders, and pelvis of the infant are so formed, that in certain circumstances, as when the infant is large, and the maternal pelvis small, they can be reduced and moulded to the passage of the female parent by nature or by art.

No obstetric instrument or manual operation ought ever to be performed until the necessity is explained to the relatives of the parturient woman or to herself, when she possesses a strong mind; so that an opportunity may be afforded of calling in another medical practitioner, if convenient, should it be desired by the woman, her relatives, friends, or acquaintances. Every medical practitioner, whether old or young, ought to observe this precept.

The woman or her friends have an undoubted right to have the opinions or assistance of as many medical practitioners as they please.

It is scarcely necessary to state, that the medical attendant may be considered too old or too young—or that there may not be sufficient confidence reposed in him.

It is always to be remembered, that women in labour have, in general, the greatest dread of manual or instrumental operations; and that religion and humanity command every thing to be done to appease their fears and alarms, as these are always more or less prejudicial to their condition, as well as to restoration to health.

It may be necessary, as was well observed by Denman, to explain the object of using the forceps, or other blunt instrument, and to prove that no injury can be inflicted upon the woman or infant, when the instrument is employed with caution and judgment.

“In some cases of great apprehension, I have also showed them, upon one of my knees, all I intended to do with the forceps.”—*Denman's Aphorisms.*

I have long followed this excellent advice, and observed to women, that the instrument was blunt, and not cutting, that it could pass where the hand could not, and that its branches might be considered as artificial hands, and would not injure the woman or infant, and that the latter might or would be born alive.

This explanation almost invariably removes all fear and apprehension.

There are, however, some nervous, hysterical, irritable, and impatient women, who, impelled by their fears, impatience, or sufferings, implore us to deliver them with instruments, long before there is a real necessity.

Such individuals may be encouraged, by fixing some remote period at which it is most likely they may be delivered, as six or twelve hours, and unless they are, and when twenty-four hours of actual and regular labour have elapsed, that then instruments will be employed.

They should also be told, that most women are delivered within twenty-four hours, without instruments; that others remain in labour a day or two, and are safely delivered without artificial interference; and that the good old remedies, time and patience, ought to have a fair trial—and that nature is the oldest and safest obstetric practitioner.

The forceps, or any other obstetric instrument, ought never to be used clandestinely, or without the knowledge of the woman, or of her friends.

There is always great caution required in the use of obstetric instruments, as great fears are entertained by most women, and great blame attached to the obstetrician, unless the woman and infant do well ultimately, and unless he possess a high reputation.

It is always necessary to impress upon the woman the imperious necessity of remaining quiet during the use of obstetric instruments, for when she is restless, there is more or less danger of injuring her, however experienced the obstetrician may be, unless extremely cautious.

When she moves suddenly, or changes her position, though the operator removes his hand off the instrument, it may contuse her slightly, and give her pain.

It is therefore manifest, that instruments ought not, as a general rule, to be applied without her knowledge, and not until having impressed her with the indispensable necessity of her remaining quiet and motionless.

Every woman endowed with common sense, will obey the advice of her medical attendant, when she places proper confidence in him.

The forceps is most commonly used when the head of the infant has descended into the cavity of the pelvis, and it should always be applied over the ears of the infant; but there is an exception in the case of the right occipito-iliac position, in which one branch is to be placed over the occiput, and the other over the forehead.

It is considered improper and dangerous to employ it when the ear cannot be felt.

Before the head makes the half turn, and the face is placed in the cavity of the sacrum towards the back of the mother, one ear will be felt under the pubis, or under one of the rami or branches of the ischia.

But when the face has fully turned into the cavity of the sacrum, a part of the occiput or hind head will be under the pubis, and the ears will be towards the sides of the pelvis.

As a general rule, the convexity of the forceps ought to be finally brought towards the concavity of the sacrum, or back of the woman, so that the concavity will be towards the abdomen or pubis, and the handles through the centre of the genital fissure, in the axis of the outlet of the pelvis.

The short forceps is used when the face is towards the cavity of the sacrum, or towards the pubis, or towards either ischium, when the crown of the head will be transverse to the genital fissure; and lastly, when the breech of the infant presents, the hips being towards those of the mother, or transverse to the outlet of the pelvis and genital aperture.

Before using the forceps, it should be brought to the temperature of the body, by being immersed in a basin of warm water, or held near a fire. It should then be wiped dry, and smeared with pomatum, lard, &c., to facilitate its introduction.

Position of the patient.—The obstetric position recommended by most British obstetricians is the left side; and the back, by foreign writers, which, in my opinion, is by far the better, and more natural, as it enables the operator to form a more accurate opinion of the relative situation of the head to the pelvis; and when using the forceps, he is not incommoded by the right inferior extremity of the patient as when she is placed on the left side.

The pelvis of the woman ought to be close to the edge of the bed, and she should be strongly impressed with the necessity of keeping it in this position.

When the patient is placed on the left side, the nurse or some other person must support and raise the right inferior limb, to allow one branch of the instrument to be introduced; but this assistance is not necessary, when the dorsal position is adopted.

The female assistant often allows the supported limb to fall against the branch or handle of the forceps, while it is being passed, which incommodes the operator, and pains the patient.

When the patient is placed on the back, her pelvis should be near the foot of the bed, or near the edge, or she may be placed across the bed—her head and shoulders being raised with pillows.

The lower extremities should be separated, each foot placed on a chair and the knees held by assistants, and the obstetrician should sit on a chair between the limbs, the person of the woman being covered.

General Rules for the application of the Forceps.—When the head of the foetus presents in a direct position, viz., the occipito-frontal diameter placed towards the antero-posterior of the pelvis, (see *plate 1, figs. 2, 3; plate 2, fig. 1*), some advise the left hand branch of the forceps to be introduced first, and then the right; but, in my opinion, it is of little, if of any consequence, which branch is passed, when the woman lies on her back.

When the head is placed diagonally, the occiput or forehead towards the left acetabulum, the right hand branch is introduced first, and then the left, with the right hand. But when the occiput or forehead corresponds to the right acetabulum, the left hand branch is to be introduced first, and then the right hand branch with the left hand.

The convexity of the edges of the branches of the forceps should finally correspond to the concavity of the sacrum, and the concavity of the instrument to the arch of the pubis. The instrument is curved on this account. The convexity of the sides of the forceps should always correspond to the concavity of the parietes of the pelvis, and the concavity to the convexity of the head of the foetus, (see *plate 31, fig. 2*).

Two fingers of either hand should be placed on the scalp of the infant, and carried up to and over the ear, and the branch of the instrument passed along the palm of the operator's hand, the womb being kept outside the fingers, (see *plate 30, figs. 1, 2, 3*), and never to be included between the blade of the forceps and the infant's head. Attention to this precaution, prevents the possibility of the operator injuring the womb or vagina. The mode of introducing each branch of the forceps is illustrated in *plate 30, figs. 1, 2, 3*.

When both branches are carefully introduced over the ears of the foetus, the next point is to articulate or lock them, and great care must be taken not to include any part of the external genitals or capillary growth in the joint or lock. There is often much difficulty in avoiding this in primiparous or first labours, which require the use of the forceps, when the external genital aperture has not been dilated by the presentation of the infant, as is often the case; and, under these circumstances, while one obstetrician endeavours to unite or lock the forceps, another must prevent any part of the patient being included. There is often much difficulty in uniting the branches of the forceps, as will appear in the course of this article, as well as the best mode of obviating it. (See *plate 31, fig. 1*.)

When the forceps is applied, the head being at the outlet or inferior aperture, the handles ought to be in the centre of the vagina, or axis of this aperture, (*plate 2, fig. 1 ff*); and when applied in cases in which the head is above the superior aperture or brim, the handles should be as near the inferior commissure of the vulva as possible.

There are eight positions of the head, at the superior and inferior apertures of the pelvis, which may require the use of the hand, forceps, lever, perforator, craniotomy forceps, or crotchet; but these may be reduced to two direct, two transverse, and four diagonal. The most common of these I proceed to describe, as well as the modes of applying the forceps, which will also guide the operator in the rest.

POSITIONS OF THE HEAD AT THE OUTLET OF THE PELVIS WHICH
REQUIRE THE USE OF THE FORCEPS OR LEVER.

1. *Occipito-anterior*—occiput or back of the head to the pubis, face to the sacrum.
2. *Occipito-posterior*—face to the pubis, occiput to the sacrum.
3. *Occipito-ischiatic*—occiput to the right or left ischium.
4. *Fronto-ischiatic*—forehead to the right or left ischium.

1. *Occipito-anterior position*—back of the head to the pubis, face to the sacrum. *Mode of applying the forceps.*

When the face of the infant is in the hollow or concavity of the sacrum, the operator should introduce the index and middle fingers of the right hand, lubricated as already described, to the ear of the infant, and then pass the left hand blade of the forceps along the palm of the right hand, and two fingers over the ear of the infant, the womb being kept external to the fingers and instrument. (See *plate 30, fig. 1*).

The further introduction must be made with a semi-rotatory motion, and the point of the branch or blade should be always kept in contact with the head of the infant, by gradually raising the handle as the instrument is advanced. (See *plate 30, fig. 2*).

The branch of the forceps must be cautiously passed upwards into the uterus, along the two fingers, until the lock approaches close to the pubis.

If any impediment obstructs the passage of either branch of the forceps, it ought to be withdrawn a little, to discover the obstacle, and the operator should never attempt to overcome it with force or violence.

As soon as the first branch is properly applied, it must be held in its situation by an assistant, or by placing the handle between the thumb and index finger of the left hand, after the fore and middle fingers have been introduced and placed over the ear of the infant. (See *plate 30, fig. 3*).

The second or right hand branch must be passed along the palm and two fingers of the left hand, in the manner described when using the first branch.

When the second branch is properly introduced, it should be opposite to the first, or very nearly so. (See *plate 31, fig. 1*).

The next step of the operation is to lock or unite both branches.

In order to lock the branches, the handles must be depressed, raised, or the blades partially withdrawn, until they fall into the lock or joint intended to unite them, (See *plate 31, fig. 1*).

Due care must be taken not to include any part of the patient in the lock or joint of the instrument, by passing the finger around it.

The handles of the blades may be tied together to prevent their slipping or changing their position, but a dexterous operator will secure them with his hand.

When the branches are improperly applied, they are not opposite each other, and cannot be locked, and if any attempt is made with them to extract the head, they will certainly slip, and may injure the soft parts within the pelvis.

When the handles approach each other very closely, the bulk of the head is not embraced between the branches, and then if extraction is attempted, these will slip and lose their position.

Again, when the handles are at a great distance from each other, the branches are not properly applied, and when traction is attempted, they will lose their situation.

When the forceps is properly applied it can never slip.

The difficulties encountered in applying the forceps arise from attempting to use it too soon, from passing its branches at random or hastily, or in a wrong direction, or from entangling some of the capillary growth or soft parts of the mother in the lock, or between the instrument and the head of the infant.

All these errors ought to be carefully avoided.

When the forceps is properly applied in the presentations under notice, viz. the face to the sacrum, and the occiput to the pubis; the handles of the instrument will be in the centre of the vagina, which is the axis of the outlet of the pelvis. (See *plate 31, fig. 2*).

Method of making traction with the forceps.—Traction should be made from side to side, and upwards, towards the pubis, in the axis of the outlet of the pelvis in which the infant passes into the world in natural labour. It should be made “as if freeing a stiff drawer.”

It should never be made forwards or downwards, as in such case the head would be drawn in a wrong direction against the sacrum, os coccygis and perineum, and could not be extracted without inflicting severe or fatal injury on the woman, or lacerating the perineum.

All operators unacquainted with the anatomy of the pelvis and the mechanism of parturition fall into this error, and too often do the most serious mischief both to women and infants.

As a general proposition, it may be maintained, that no medical practitioner, who has not attended obstetric lectures and demonstrations, ought to attempt any obstetric operation, as he must be a most dangerous operator.

Traction should be made during the labour pains, or at an interval of five or ten minutes, when there is a total want of pain, in *imitation of Natural Labour*.

When the head begins to descend, the force of traction with the forceps must be abated, as nature may now effect delivery.

But when the labour pains are absent, and the genitals rigid and undilated, care must be taken to bring down the head slowly and gradually, in strict imitation of what happens in natural labour, to support the perineum, and to prevent its laceration.

As soon as the perineal tumour is formed by the descent of the head, the handles of the forceps which are towards the abdomen, ought to be slightly depressed, so as to allow the occiput to escape under the arch of the pubis.

The obstetrician must now change his hold of the handles of the forceps, and grasp them, so that the back of his hand will be to the abdomen of the patient. (See *plate 31, fig. 2*).

He then supports the perineum with the left hand, while he makes

traction with the right towards the abdomen of the patient, which will finally deliver the head in the curved line in which it passes during natural labour. (See *plate 2, fig. 1; plate 31, fig. 2*).

When the head is brought down so as to rest on the perineum, some obstetricians remove the forceps, and leave the completion of labour to nature.

This may be done when the labour pains are strong and regular, and the perineum dilatable, but not when the pains are weak, and the perineum rigid.

In some cases there is delay in applying the forceps, and in others considerable force must be employed in using it, so that one operation may require a few minutes, and another one or more hours.

In every case, we should use as little force as possible, and only increase it when necessary, and we ought always remember the danger of contusing the soft parts of the woman, or the head of the infant. The rule is, "*arte non vi*," by science not force.

When the head of the infant is born, the forceps may be untied and removed, and the shoulders and body adapted to the pelvis, as in natural labour. (See *plate 16, figs. 2, 3; and plate 17, figs. 2, 3*).

If there should be much difficulty in extracting the shoulders on account of their size, the finger or blunt-hook may be passed in the axilla or armpit of the lower one, and traction made towards the abdomen of the mother, as delineated in the plates just mentioned.

2. *Occipito-Posterior Position, Face to the Pubis—Occiput to the Sacrum.* *Mode of applying the Forceps.*

In cases in which the face is to the pubis, and the occiput in the concavity of the sacrum, the forceps is applied in the same manner as in the preceding presentation—the face to the sacrum. (See *plate 22, figs. 2, 3*.) In this case the chin ought to be extracted under the arch of the pubis, by depressing the handles of the instrument, and closing the mouth of the foetus, by placing the index finger under the lower jaw. When the chin has escaped under the arch of the pubis, the handles of the forceps are to be raised towards the abdomen of the woman, in the same manner as described in the last presentation, and great care should be taken to support the perineum, which becomes very much distended when the occiput is passing through the external genital fissure.

Some advise the occiput to be extracted before the chin, but much will depend upon the dilatability and rigidity of the perineum and external genital aperture, and these will vary according to the age of the woman, whether very young or very old, as from thirty to forty, forty-five, or fifty years of age, or whether it be a first or future labour. In some cases the chin is more easily extracted than the occiput, and *vice versâ*, as much will depend upon the size or developement of these parts.

This second presentation is much more difficult and painful than the first, and requires very great care.

This statement will be manifest on referring to the different dimen-

sions of the infantine head, and comparing the size of the vertex or crown with other parts, as described in pp. 21, 22, and illustrated in plate 2, figs. 2, 3.

3. *Occipito-ischiatic*.—4. *Fronto-ischiatic Positions*—*Occiput or Forehead towards either ischium*—*Mode of applying the forceps*. (See plate 14, fig. 2).

The object in these cases is to pass one branch or side of the forceps over the ear which is under the pubis, and the other over the ear which is towards the sacrum. The convexity of the branches should be towards the face or occiput, so that when either is brought into the concavity of the sacrum, its convexity will be adapted to it. It is better to turn the face than the occiput into the cavity of the sacrum, as this brings the head into the natural position in labour. (See plate 14, fig. 1).

In applying the forceps in this class of presentations, the best position in which to place the patient will be on the left or right side, near the edge of the bed.

As soon as the branches are applied and locked, the face, if possible, or occiput is to be turned into the concavity of the sacrum, and the mechanism will be that of the occipito-anterior or posterior position, as just described.

The French and other European Continental authors describe four other presentations of the head at the inferior and superior straits of the pelvis, which they designate diagonal, but in these cases the forceps is to be applied according to the rules already laid down in the preceding paragraphs, descriptive of the proper use of this instrument. Suffice it to state, that the convexities of the branches must always be finally towards the concavity of the sacrum, and their concavities always finally towards the pubis, and that in all cases, the face should be turned into the concavity of the sacrum when possible, in preference to placing the occiput in that situation, which would be more difficult of extraction.

Diagonal Presentations.—1. The occiput corresponds to the left acetabulum, the forehead to the right sacro-iliac symphysis.

2. The occiput corresponds to the right acetabulum, and the forehead to the left sacro-iliac symphysis.

3. The occiput corresponds to the right sacro-iliac symphysis, and the forehead to the left acetabulum.

4. The occiput corresponds to the left sacro-iliac symphysis, and the forehead to the right acetabulum.

Positions of the Head at the Brim or superior Aperture of the Pelvis.

These are the same as at the outlet just described, and are to be changed with the long forceps or lever, or by version, and when these fail craniotomy becomes necessary.

When the long forceps is applied on the head at the brim of the pelvis, its handles ought to be in the axis of the brim, and rest on the inferior commissure of the genital fissure towards the back of the woman, as near the os coccygis as possible.

But as soon as the head is brought into the cavity of the pelvis, or

near the outlet, the handles of the instrument should be raised to the centre of the vagina, or axis of the outlet.

Impaction or Locking of the Head.—This term is employed when the head is so jammed in the brim, cavity, or outlet of the pelvis, that it cannot advance or recede.

When the compression is strong, and long continued on the organs of the woman, inflammation, or gangrene may be induced, and communications established between the different passages in the pelvis, giving rise to urethro-vaginal, vesico-vaginal, and recto-vaginal fistulæ, which render the woman an object of pity and disgust, in as much as the urine, or fæces, or both, may pass into the vagina, cause irritation, inflammation, abscess in all the parts about the outlet of the pelvis, and so much constitutional irritation as to destroy life.

Long continued impaction or compression may also cause congestion of the infantine scalp and brain, and thus destroy the infant. Impaction of the head, as well as all difficult labours, may cause rupture of the womb, a most dangerous disease, exhaust the powers of life, like severe and long continued pain of any kind, as that of cancer, of a bad burn, &c., and terminate in death.

It is an obstetric axiom, that in all difficult and dangerous cases of labour, no matter what may be the presentations or circumstances, when formidable diseases may be induced in the mother or infant, or the life of either is in danger of being seriously injured or destroyed, delivery ought to be effected as soon as possible, either with the hand alone, or with instruments.

The head may be impacted in its antero-posterior, and bi-parietal diameters. The occiput may be towards the pubis, sacrum, or to either ilium.

When in the last positions, it has been proposed by some to apply the forceps over the occiput and forehead, while others advise it to be placed over the ears, as in ordinary cases.

If the infant is dead, the head ought to be opened and diminished in size; but if alive, the forceps should be applied, if possible; and should this fail to effect delivery, the pressure of the womb will soon destroy the infant, and then the head may be perforated, and reduced in size. When the infant is alive, the French perform symphyseotomy, or incision of the pubis; an operation not performed in this, nor most other countries, for reasons hereafter stated.

The *face* may present like the crown of the head in two direct, and four diagonal positions at the superior and inferior apertures of the pelvis, and in its cavity, (see p. 208).

1. *Direct.*—The forehead corresponds to the pubis, and the chin to the sacrum.

2. The chin is to the pubis, and the forehead to the sacrum.

1. *Diagonal.*—The forehead is to the left acetabulum, the chin to the right sacro-iliac symphysis.

2. The forehead is to the right acetabulum, the chin to the left sacro-iliac symphysis.

3. The forehead is to the right sacro-iliac symphysis, the chin to the left acetabulum.

4. The forehead is to the left sacro-iliac symphysis, and the chin to the right acetabulum. For management of these cases, see p. 209.

Body Born, and Head in the Womb.—The base of the skull may present in the same positions as the vertex or crown; and should be extracted with the hands, forceps, lever, or by craniotomy, in the axes of the brim, cavity, and outlet of the pelvis, as in natural labour.

POSITIONS AT THE INFERIOR APERTURE.

1. *Direct.*—The occiput is to the arch of the pubis, the face to the curve of the sacrum.

Operation.—An assistant supports the body with both hands, the operator applies the forceps on the sides of the head, raises its handles towards the abdomen of the mother, and at the same time supports the perineum. (See plate 31, fig. 2).

2. *Direct.*—The occiput is to the curve of the sacrum, and the forehead to the arch of the pubis.

Operation.—An assistant supports the body, under which the forceps is applied on the sides of the head, the perineum is supported, and the occiput or chin is extracted first, according to the degree of facility afforded by either part.

1. *Diagonal.*—The occiput corresponds to the left acetabulum, the forehead to the right sacro-iliac symphysis.

Operation.—The forceps is applied under the body of the infant, which is supported by an assistant, the head is brought into the first direct position, and extracted in the same manner.

2. *Diagonal.*—The occiput is to the right acetabulum, the forehead to the left sacro-iliac symphysis.

Operation, as in last case.

3. *Diagonal.*—The occiput is to the right sacro-iliac symphysis, the forehead to the left acetabulum.

Operation.—The forceps is passed under the body of the infant, which is supported by an assistant, the head seized in its long diameter, rotation made so as to bring the face under the pubis, and the occiput into the hollow of the sacrum; and the extraction is then accomplished as in the second direct position.

4. *Diagonal.*—The occiput is to the left sacro-iliac symphyses, the forehead to the right acetabulum.

Operation.—Same as in last position.

When the occiput is to the left or right side of the pelvis, it is to be rectified as in the first and second diagonal positions.

Positions of the base of the cranium at the superior aperture.—These positions are the same as at the inferior aperture just described. They are consequently direct and diagonal.

Operations.—In all cases, the long diameter of the skull is to be adapted to the long diameters of the brim, cavity, and outlet of the pelvis. (See plate 2, fig. 1; plate 32, figs. 1, 2).

When the head cannot be adapted with the hand or blunt instruments, it should be perforated, reduced in size, and extracted as in cases of craniotomy of the vertex or crown.

In all cases of preternatural presentations at the superior aperture of the pelvis, there is little, if any, pressure on the mouth of the womb, or on the vagina, which are not distended by the presenting part, as in natural labour by the head, breech, legs, or feet; and hence there is generally much difficulty, and great caution required in passing the hand or instruments in such cases; and some pain is necessarily and inevitably inflicted on the woman to save her life.

But in all such cases the obstetrician should be as gentle as possible, and persevere for one or several hours, to save the lives of parent and offspring, or of either.

The forceps may also be applied over the infant's hips in breech cases, great care being taken that the points of the branches do not press on the loins. The instrument is very rarely employed in such cases, nor is it necessary when they are managed judiciously.

APPLICATION OF THE LEVER OR VECTIS.

This instrument is used in the same cases as the long and short forceps. It bears a strong resemblance to one blade of the forceps, but is more curved. (See *plate 40, fig. 2*).

In most cases the instrument ought to be passed along the head and face, as far as, or over the forehead, chin, or occiput of the infant.

When the occiput is towards the pubis at the inferior aperture, two fingers are introduced between the perineum and head, and the lever applied over the forehead, traction being made towards the abdomen of the mother. (See *plate 33, fig. 1*).

The concavity of the instrument should be towards the convexity of the head. The lever may also be passed along the side of the head, and brought over the forehead and face, or over the occiput, when towards the pubis. In the latter case, the handle of the instrument should be depressed so as to free the occiput, and then it may be placed over the forehead or chin, as in (*plate 33, fig. 1*), and traction made towards the abdomen; the perineum, when distended, being properly supported with the other hand.

As soon as the head is on the perineum the lever may be removed, and nature allowed to complete delivery; but if she fail, the forceps must be applied; and when this does not succeed, craniotomy may, in some rare cases, become necessary.

When the occiput is towards the sacrum, the lever may be applied over it, traction made towards the abdomen, while the forehead, face, and chin, are depressed with the fingers of the other hand, (see Occipito-posterior position of the head at the outlet, p. 232, and *plate 22, figs. 2, 3*, for application of the forceps), and the same rules apply in this case.

When the occiput is towards the right or left acetabulum, the lever is passed over the side of the head which is posteriorly, and then over the occiput, which should be brought towards the pubis or sacrum, and extracted in either position, in the modes above mentioned.

When the occiput is towards either sacro-iliac symphysis, the lever should be applied, so as to bring it in either of the positions just described.

When the occiput is towards either ilium, or in the transverse diameter

of the pelvis, it is to be brought down in the same manner as when it corresponds to either acetabulum.

In all cases in which the occiput presents at the *superior* aperture of the pelvis, or in its cavity, in the different positions as at the inferior aperture, the lever should be applied in the same manner, and with the same precautions as at the latter, except that when the occiput is towards the pubis or sacrum, (see *plate 32, figs. 1, 2*), the head should be turned into the long diameter of the brim or superior aperture, (see *plate 1, fig. 2, aa*; *plate 14, fig. 1*; *plate 16, fig. 1*; and next, as in *plate 14, figs. 2, 3.*)

When the positions are oblique, or transverse at the superior aperture, the applications are the same as at the inferior. The lever is less useful at the superior than at the inferior aperture, and most operators prefer the forceps, but the former can be applied in transverse presentations, when the latter cannot.

The long forceps, which is the same as the short, except that its branches are somewhat longer, is applied to preternatural presentations of the head at the superior aperture, which are very rare, and the same instrument can be as advantageously used at the inferior aperture. But the cases are so rare in which the presentations are preternatural at the superior, or abdominal aperture, or brim of the pelvis, that few obstetricians unless public professors, or those in consultation practice, supply themselves with the long forceps or the lever, craniotomy being preferred.

In continental Europe, in America, and in the Indies, the instrument called the long forceps in this kingdom is generally used, at both apertures of the pelvis.

Every obstetric professor has modified the forceps, but I feel convinced that the one delineated in *plate 40*, which is that of Smellie, Osborne, the Hamiltons, Denman, &c. &c., is the best. Its branches may be elongated at the desire of all who deem it an improvement.

When the labour pains return, the handle of the instrument must be raised gently but firmly towards the pubis, and extracting force employed at the same time.

Some advise the operator to rest the vectis on the symphysis pubis, or upon the ramus of the ischium as a fulcrum, and thus to compress the soft parts of the woman. But by passing the palm of the hand on the back of the blade of the instrument when in action, the other hand will form a fulcrum, and the pressure on the soft parts of the woman will be completely avoided.

The instrument is thus converted into a lever of the first class, the handle held firmly with the right hand, the left a fulcrum, and no pressure made on the soft parts of the mother, but on the head of the infant and hands of the obstetrician.

The vectis or lever is a very inferior instrument to the forceps, and is now very little employed, though some few practitioners prefer it.

Lastly, the lever may be applied over the hip of the infant in breech presentations, (see *plate 33, fig. 3*), and traction or extraction made in the axes of the brim or superior aperture, cavity, and inferior aperture of the pelvis.

THE BLUNT HOOK—BLUNT CROTCHET.—This instrument may be

applied under the arm next the perineum, in natural, forceps, or lever cases of labour, or after craniotomy, when the shoulders, either on account of their size, the smallness of the maternal pelvis, or rigidity of the external genitals, cannot be extracted with the fingers. It may also be employed when the head, shoulders, and body of the infant are expelled in natural labour by the head, and the hips of the infant are turned towards those of the mother, viz., the long diameter of the former being to the short diameter of the latter, at the inferior strait or aperture of the pelvis.

In such cases, the blunt hook may be passed along the back of the infant, and between its thighs, and one of its hips turned into the long diameter of the brim, cavity, or outlet of the maternal pelvis. The use of the instrument is rarely necessary in such cases, because the obstetrician can, in general, turn the hips of the infant with both his hands, the head and remainder of the trunk having been already expelled beyond the external genital aperture, into the proper directions of the pelvis; but I have attended cases in which the use of the blunt hook was necessary.

But when the infant presents by the breech, its hips being towards those of the mother, inversely, (see *plate 31, figs. 3, 4*), the fingers or blunt hook may be applied between the thigh and hip, (see *fig. 4*), and the presenting parts of the infant adapted to the largest measurements of the brim or superior aperture, the cavity, and inferior aperture of the pelvis. When the infant has descended by the breech, knees, legs, or feet, as in natural parturition by these parts, (see p. 28), and the knees present transversely, they may be properly adjusted with the hands, or the blunt hook passed into the right or left ham, and the breech turned into the proper relation to the pelvis. But if one or both present, and are withdrawn when touched by the fingers of the obstetrician, I have succeeded in drawing down the presentation or presentations by placing the blunt hook on the ankle anteriorly, between the foot or feet and legs, and in a few cases over the heel or heels. (See *plate 31, figs. 3, 4*).

When the body of the infant is born by the feet, as far as the neck, (see *plate 24, figs. 2 and 3*), the forehead of the infant may be to the back or sacrum of the mother, and both arms or superior extremities on each side of the head, they may, in general, be extracted as delineated in *plate 24*, or one may be turned to the sacrum and the other to the pubis, when they will be brought down with more difficulty by the fingers than in the former position, more especially when the shoulders are large and the pelvis small. In such cases, when I could not extract the superior extremities of the infant with the fingers, I have passed the blunt hook to the inner surface of the elbow and drawn it down, supporting the perineum at the same time, while the point of the elbow was being passed through the external genital aperture.

The blunt hook may also be passed into the mouth of the infant, when dead, or it is extracted by version or turning, (see p. 211), and when the finger introduced into this part fails to extract it, (see *plate 25, figs. 1, 2*); or after craniotomy, when there is great disproportion between the infant's head, in consequence of great or extraordinary developement, hydrocephalus, or the attachment of tumours, and it

cannot be extracted with the fingers, the blunt hook may be employed, but the head must in general be reduced by perforation, and extracted with the craniotomy forceps. (See *plate 35, figs. 1, 2, 3*).

In the latter cases, (see *Craniotomy*,) the infant being dead before the performance of the operation, the head opened or partially broken down, the blunt hook may be fixed in the socket of the eye, in the cavity of the ear, in the mouth, under the chin or lower jaw, or on the anterior or posterior surface of the neck; and also in the interior of the cranium, under the posterior portion of the temporal bone, or in the occipital foramen, when traction may be made in the proper direction, and should the instrument prove inefficient, the crotchet or sharp hook may be applied to the same parts, (see *Crotchet*). In cases of decollation, or separation of the head from the trunk by incision, the blunt-hook, crotchet, (see *plate 37, fig. 1*,) when the anterior or posterior aspect of the neck presents, and cannot be rectified with the hand, (see p. 209,) the instruments may be fixed under the clavicle or collar-bone, or scapula or shoulder-blade, and the trunk extracted and reduced in bulk.

In extreme cases, either instrument may be used inversely after decollation or decapitation in the womb or vagina, the base of the skull presenting, by being inserted in the socket of the eye, the cavity of the ear, occipital foramen, anterior or posterior fontanelle, in the mouth, under the lower jaw, and traction made so as to adapt the base of the skull to the proper diameters of the pelvis, (see p. 211). Should the operator fail with one or both instruments, craniotomy will be indispensable, (see this term).

In some very rare cases, the blunt-hook may be passed under the false ribs on either side, the head and the shoulders having been previously expelled externally, and also between the thighs, or over the os coccygis, and the breech of the infant adapted to the cavity or outlet of the pelvis.

When the opened head is extracted by the blunt-hook or crotchet, should there be any difficulty in bringing the trunk, either instrument may be applied on the spine, promontory of the sacrum, or sacro-ischiatic notch, if possible, but in such cases one or both may slip, and traction by the hand succeed when one or both fail.

When the infant presents by the sternum or breast-bone, by the ribs or abdomen, it may become necessary, when all other means fail, to perforate these parts, eviscerate the chest and abdomen, divide the spine with the blunt-hook or crotchet, and bring down either extremity, (see p. 210; and *plate 37, figs. 3, 4*).

The Fillets.—Bands or ribbons of different sorts are sometimes applied over the wrist, ankle, arm, leg, and round the thighs in breech cases, to assist in extracting the infant. This contrivance is rarely used in this country at present. A silk handkerchief has been passed over one hip and between the thighs in breech cases, and traction made by means of it. A ribbon or small bandage is passed by continental obstetricians round the arm or leg, when either of these parts present; but it is almost useless, as very inefficient traction can be made by it, in any case. (See *plate 26, figs. 1, 2*).

In all difficult labours, in which delivery cannot be effected with

the hand alone, as when pedal or cephalic version cannot be accomplished, spontaneous version is not to be expected, and blunt instruments or tractors, as the forceps, lever, blunt hook, and bands or fillets fail, recourse must be had to the induction of *Premature Labour*, or to the use of incisive or cutting instruments.

Induction of Premature Labour.—When there is great disproportion between the size of the infant and the pelvis or passage of the mother, at the full period of pregnancy, and either the hand, or blunt instruments cannot accomplish delivery, we must have recourse to incisive or cutting instruments, to diminish the size of the infant; and the French physicians add to enlarge the passage of the mother by symphyseotomy, an operation not performed as yet in this country, and which I shall minutely describe hereafter. When the pelvis of the mother is unusually small, and the infant large, or above the usual size, as when small slight women are impregnated by full-grown or large men, the labours will, in general, be tedious, painful, and difficult, the infants are generally destroyed by the pressure made by the womb while in a state of contraction during each labour pain, and blunt or cutting instruments, are required. The same rule applies when the pelvis is contracted by disease, malformation, existence of tumours, &c.

It is well known to agriculturists that many small animals which are with young by large males, die undelivered.

When women are deformed, and their infants cannot be born alive at the full period of pregnancy, it was formerly advised to restrict the mother to low and sparing diet, with a view of preventing the full growth of the infant, but this plan signally failed; and indeed could not have succeeded, when we consider the mode of nourishment, or supply of blood from the mother to the foetus during pregnancy, (see pp. 132, 146; *plates 5, 6, 7, 8*).

It is true that some women in delicate health, whose appetite is bad during the greater period of pregnancy, or who have been repeatedly bled, and reduced by purgatives, bring forth small or ill-grown infants, but these generally die in a short time, are always reared with difficulty, and seldom arrive at the adult age.

It was long observed, that infants born at the seventh month and a half generally survived, though delicate, and reared with difficulty; and this led physicians to the conclusion, that the induction of labour at this premature period should be effected to save the life of the infant, or give it the only chance of surviving; when it would be inevitably destroyed at the full term of pregnancy.

The operation was first proposed and performed by Dr. Macaulay, of London, in 1756, to obviate the necessity of craniotomy, gastro-hysterotomy, and symphyseotomy.

Velpeau, with great candour and credit to himself, prefers this operation to the more dangerous proceedings which his countrymen still advocate, and very justly considers it more safe for the mother and infant. He thinks that a thousand social relations compel us to save the mother, so that in cases of deformity, which render delivery impossible at the full time, he would not hesitate to advise abortion in the first months of gestation. He says, however, that when the sacro-pubic

diameter of the brim is only two inches and a half, a living foetus may be expelled without the aid of art. He thinks the induction of premature labour warrantable in such cases after the seventh month, as the bi-parietal diameter at that time is generally three inches, and the head capable of diminution by compression. He argues, however, that this resource is not so advantageous as is generally imagined; because it may be followed by hæmorrhage, convulsions, or peritonitis, the uterus may be wounded, the infant may be feeble, there may be slight uterine contraction, and delivery may not happen for five days. These objections are invalid, as they may be urged in cases of natural labour, and may be obviated by judicious management and the use of the ergot of rye. Besides, the usual success of the operation is an answer to all objections.

In 1819, the late Professor Hamilton, of Edinburgh, induced premature labour in twenty-seven cases, and saved twenty-three infants.

This operation has been performed, when the length of the superior aperture of the pelvis, from before backwards, the antero-posterior, or sacro-pubic diameter, measures only from two to three inches instead of five, as in the ordinary sized woman. The object in such cases is laudable, and not criminal; namely, to save the life of the infant, and the operation totally differs from the induction of criminal abortion, which is never attempted by the medical faculty, who justly consider it foeticide or homicide, but cases occasionally occur, in which women are so deformed, that although their infants may be extracted alive at seven months and a half, they must be destroyed either by the efforts of nature in strong labour at the full time, which cannot expel them, or by art; and it has frequently happened, that as many as seven and more infants have been thus successively destroyed. A most important question here arises, as to the morality of such women having children at all, and if they have, whether the former ought not be saved by the induction of premature labour. When they cannot be saved by this means, it was the opinion of the late revered and virtuous Dr. Denman, and most others of his contemporaries and successors, that however dangerous the Cæsarean operation, which was almost mortal in his time, it should be performed upon a woman who had so many infants successively destroyed, when in a future labour. The induction of premature labour, is, however, preferred at present.

I may here observe that there are not theologians, juris-consults, or physicians, even of these enlightened times, who will venture to determine the propriety of separating husbands and wives, or of their using any means to prevent the great object of matrimony. But is infant after infant to be destroyed, either by omission or commission? The result is the same—the death of human beings. In a moral point of view, it matters not whether an infant is starved, exposed to cold, strangled, or so treated or neglected, that its life is destroyed. A woman is assured by competent medical authority that she can never have a living infant at the full time, though she may have seven or eight infants in succession, every one of whom will be destroyed by the efforts of nature or by art, unless saved, when possible, by the induction of premature labour.

I have given this subject very mature consideration, and my deliberate conviction is, that husbands and wives are, in general, equally culpable: sometimes the one, and sometimes the other, but mostly the former; in causing such repeated destruction of human life. I have repeatedly known instances of both, in which either party was perfectly indifferent on the subject; but there are many exceptions in which most persons deeply deplore the want of offspring. But however extreme the cases under consideration may be, the medical faculty will not interfere with the dictates of nature, nor violate the laws of religion. What a contrast exists between them and the modern anti-populationists, who insanely propose to limit families, or, in plain English, prevent procreation among healthful individuals, on the fallacious grounds of want of sufficient nutriment, although there is not a single civilized country on the face of the globe at present, to which this immoral, erroneous, and inhuman doctrine can apply. I have fully exposed and denounced this infamous doctrine in another work, "*The Philosophy of Marriage*," 1839, 3rd edition, and its baneful consequences in another volume, "*Prostitution in London, Paris, New York, &c.*", already quoted. I need scarcely observe, that if the medical faculty were to recommend such a doctrine, even in the extreme instances which gave rise to these remarks, they would, in all probability, do much more harm than good to the interests of society at large. They, therefore, always follow nature's laws and dictates, and assist her as much as possible.

When the dimension of the superior aperture, the cavity, or the inferior opening or outlet of the pelvis is so deformed that an infant cannot be born or extracted alive at the end of pregnancy; or when morbid, bony, or soft tumours exist in the pelvic cavity, and impede parturition, the induction of premature labour, or craniotomy, must be performed to save the lives of the infant and mother. In some cases, one or both ovaries may be enlarged very considerably, so as greatly to impede or prevent parturition, or endanger the life of the mother or infant during labour, at the full time, in consequence of the increased size of one or both organs, caused by determination of blood to the womb during pregnancy, for its enlargement, and fitting it for the due nourishment of the foetus.

Dr. Ashwell, Professor of Midwifery in the Medical School of Guy's Hospital, strongly advocates the necessity and propriety of inducing premature labour in most such cases, but I cannot fully agree with him in opinion; as there are many cases in which the operation is not absolutely necessary: and the force of this statement will be admitted by all those who have carefully studied and observed the progress of ovarian diseases, as well as their varied morbid contents.

Operation.—When the operation of inducing premature labour is deliberately determined upon, after mature reflection on all the circumstances of the case, it should be performed in the following manner, which I describe in one of the learned, though dead languages, to prevent it from being attempted for improper and criminal purposes.

Circa orificium uteri ad pollicis spatium separatur membrana decidua, digito indice, et postea exhibetur ergota, more solito ad partum accelerandum. Si, post dies tres, non accideret partus, dein incidetur instru-

mento aliquo acuto, membrana decidua, pro ut effundatur liquor amnii, vulgo dicto, aqua. (See *plate 36, fig. 1*; and also *plate 40*).

The operator must take great care not to injure the womb, lest fatal inflammation of this organ, of the peritoneum or intestines, may be rapidly induced. The ergota rarely succeeds in causing the womb to expel its contents before or after the operation just described, and frequently causes the organ to contract forcibly, inducing retention of part of its contents, for days, weeks, or months, after its exhibition. Such cases have fallen under my own observation, especially when the medicine had been exhibited too freely before I saw the patients.

In fine, the induction of premature labour is but rarely performed in this country, and it should not be confounded with criminal attempts, generally fatal to mother and infant, which are sometimes made to cause abortion, for the purpose of concealing the shame and disgrace of illegitimate pregnancy, which are never made by the respectable portion of the medical faculty in any civilized country; and even very rarely by those unprincipled persons who illegally style themselves members of the profession. I have fully considered this subject elsewhere, (see *Manual of Medical Jurisprudence*, 1836), to which I refer the reader. When premature labour occurs or is induced, it is to be managed as cases of parturition at the full period or end of pregnancy, according to the rules and precepts already laid down.

M. P. Dubois gives the results of the induction of premature labour in his *Thesis de Concours, Mai, 1834*, as follows:—

There were 127 cases; Reseigner describes 74; Salomon, 34; Ferrario, 6; W. Campbell, 2; Mende, 4; Schoer, 4; Ramsbotham, 2; Stoltz, 1.

Kilian has found the number as follows, 1831, viz., 161.

In England, 72; in Germany, 79; in Italy, 7; in Holland, 5.

Of these 161 cases, 46 infants were born dead, 115 living, of which 73 survived.

Eight women died after delivery, but five of them independently of the operation.

M. Geurin, the able editor of the *Gazette Medicale de Paris*, tom. 2, 1834, states that the actual number to that date was 170.—*Velpeau, olim cit.*

But, in this kingdom, craniotomy is generally preferred when the woman has arrived at the full term of pregnancy, as will appear by reference to the account of that operation. Few British obstetricians attempt the induction of premature labour, as the majority are fearful of the statute law, which is erroneously supposed to class the operation with criminal abortion, which is not, nor can be, the decision of any British judge who presides in our courts of justice. The profession, generally, in this United Kingdom, prefer incisive operations, especially craniotomy, the respective merits of which I shall notice in the succeeding pages. I shall first describe the operations summarily, and then minutely.

INCISIVE OBSTETRIC OPERATIONS.

The Incisive Obstetric Operations are as follow :—

1. *Embryotomy, or Embryulcia*, dismemberment of the infantine body. This consists in craniotomy, cephalotomy, or perforation of the head, evacuation of the brain, and breaking the cranial bones into pieces, and in perforation of the chest, evisceration of its contents, and incision of different parts of the body, as decollation, detruncation, &c.

2. *Gastro-hysterotomy. Cæsarian section.*—Incision of the abdomen and uterus, in the course of the linea alba, is performed to extract the infant, when the brim, cavity, or outlet of the pelvis is so contracted or deformed, that the dismembered infant cannot be removed through it even by embryotomy. There is another modification of this operation termed *vaginal hysterotomy*, which consists in making an incision in the uterus through the vagina.

Vaginal-hysterotomy is required when the uterine orifice is scirrhus or nearly impervious, when there are certain obliquities of the uterus, and when there is extra-uterine foetation.

3. *Gastrotomy* is performed in extra-uterine pregnancy, or when there is rupture of the uterus, and the foetus has escaped into the cavity of the abdomen, and cannot be extracted through the natural passages. This operation was lately performed dexterously by Mr. Hutchinson, of Farringdon-street, in this metropolis, with success, so far as the woman was concerned, in a case of extra-uterine pregnancy of fourteen months' duration.

4. *Symphyseotomy, section of the Symphysis Pubis. Sigaultian operation.*—When the pelvis is very much contracted, but not so much as to require craniotomy or gastro-hysterotomy, some continental obstetricians divide the symphysis pubis with a scalpel or saw, with a view of enlarging the cavity of the pelvis. They then apply the forceps, or perform version, as the case may be. The result of forcibly separating the pubic bones in this manner, will be more or less distention, or the luxation of the sacro-iliac joints, severe pains in these joints, inability to stand or walk for several months, or for the remainder of life. For these reasons the operation is not performed in this country, (see this term hereafter.)

I shall now describe these operations as practised at the present day, and also consider their value, and the objections to which they are liable. I shall commence with embryotomy and craniotomy, as most frequently performed in this empire, and then describe gastro-hysterotomy or the Cæsarean operation, elytriotomy or vaginal hysterotomy, then gastrotomy, and lastly symphyseotomy, which has not, so far as I know, been hitherto performed in this kingdom.

Embryotomy is very frequently practised in this country, but rarely in most other European nations, where the Cæsarean section, or gastro-hysterotomy, vaginal hysterotomy or symphyseotomy, is performed. The reasons are based on religious grounds; and will be noticed in this article,—and further in the account of the Cæsarean section hereafter.

Embryotomy is required when the pelvis is so small by conformation or diseased contraction, that a full-grown infant cannot be extracted through the natural passage, either with the hand alone, or with any blunt instrument. The opinion in Continental Europe is, that the infant ought to be dead or destroyed by the pressure of the womb during its contractions or labour pains, before perforation of the skull is attempted, and in this opinion I most fully concur; for I boldly deny that there is any text in either the Old or New Testament which justifies the destruction of the infant in the womb, under any circumstances whatever. But, nevertheless, the obstetric rule in this country is, that the head of a living infant should be perforated with a sharp instrument, its brain pierced, lacerated, and evacuated, the skull reduced in size (see *Craniotomy*), to save the life of the mother; and lamentable cases have happened in which, after the partial destruction of the upper part of the skull and brain, the mutilated infant was brought into the world alive, to perish in a few minutes. Most persons ignorant of medical knowledge may doubt this statement, but it is still positively correct, as every well-informed medical practitioner must admit.

I must here observe, that in all cases requiring craniotomy, the pressure of the womb in forcing the infant's head against the contracted passage of the mother, will very speedily and inevitably destroy life, by causing congestion of the brain, or apoplexy, and in a preponderating majority of instances long before the life of the mother is, or can be in danger of destruction; and it is therefore manifest that a living infant should not be invariably destroyed in general, under the false and unjustifiable impression of saving the life of the mother, which I repeat, is seldom endangered for hours or days; and when it really is, in extreme cases, the destruction of the infant will seldom, if ever, preserve it.

It is well known to obstetricians, that in all difficult labours in which the infant cannot easily pass into the world, it is sooner or later, almost if not universally, destroyed by the pressure of the womb long before the life of the woman is in danger. Every experienced obstetrician must assent to the truth of this statement, as he must have observed in practice, or read of cases in which the infant was destroyed in a few hours, or has not been felt to move for one or more days, without the powers of the woman having been exhausted, or her life endangered; so that, as a general rule, he may wait the destruction of the infant by uterine action in most cases, and ought not to effect it, if ever, by cutting instruments. Such is the rule I have adopted for nearly twenty years, and I have never lost a woman on whose infant I performed craniotomy after death, for I never did while it was living, nor never shall, because I conscientiously consider it unwarrantable, unscriptural, and unjustifiable to act otherwise, for the reasons above assigned, and for others I shall adduce in the account of the Cæsarean operation hereafter.

Neither can I agree with the French and other European obstetricians, that the Cæsarean or other incisive operations already mentioned, ought to be performed on a woman to save the life of her infant, for the purpose of baptizing it, as it would be a barbarous proceeding,

in my opinion, to subject the mother to dangerous, indeed almost fatal operations, for the extraction perhaps of a dying or dead infant, nor do I believe that there is any scriptural authority to warrant such a proceeding, or that alludes to intra-uterine baptism. But when this is considered necessary, it can be readily accomplished in most cases by passing the tube attached to the modern double injecting, or enema syringe into the womb, and in contact with some part of the infant, and the water be applied freely. There are also many cases in which the water might be applied with the finger, when the infant is low in the pelvis.

I cannot agree to the opinion, that father, mother, or obstetrician, is ever justified in warranting or effecting the destruction of a living infant in the womb under any circumstance, even before or after intra-uterine baptism, and consequently I differ from the position of Professor Hatin of Paris, a most able obstetric author, "that embryotomy ought to be performed when the mother refuses every other operation." I maintain she has no right, or any one else, to destroy the life of the infant in the womb. (See Cæsarian operation hereafter).

I also differ from Dr. Blundell and many other eminent British obstetricians on this subject.

This is not the place for theological or religious discussion, but I cannot help observing that the commandment, "Thou shalt not kill," cannot be broken without incurring great culpability. I am well aware that all religionists act differently from the principles of the Bible in modern times, but whether they are justified remains to be determined. It is a point of great importance in all cases requiring cutting operations, either on the infant or mother, to determine whether the former is alive or dead, which can be done, in most cases, by means of modern inventions, as the stethoscope and metroscope, (see *Signs and Detection of Pregnancy*, p. 159), which will enable the obstetrician to arrive at correct conclusions in general.

1. *Craniotomy* is required when the bones of the female pelvis are so deformed, that the transverse diameter from hip to hip superiorly, only measures three inches, and the antero-posterior or sacro-pubic, from front to back, measures only two inches and a half, for in such case the pelvis is too narrow to admit of the extraction of the entire infant with the forceps, or by version. The operation is also necessary when the head is so jammed or impacted in a natural pelvis, that it cannot be extracted with the hand, forceps, or lever, or by version.

In this and all other incisive operations, the instruments should be always introduced and withdrawn along the fingers, and covered by them, so that no part of the woman can be injured, even though, in some rare cases, the fingers or hand of the obstetrician may be wounded. The woman should be perfectly still, and the womb be pressed upon by an assistant, so as to fix the head of the infant, should this be necessary, which may or may not be the case. The position of the woman should be as in natural parturition, or during the application of the forceps, on the back or side. The instruments employed in this country are the perforator, the craniotomy forceps, the sharp crotchet, and osteotome, (See *plate 34, figs. 1, 2; plate 40*),

In France, a bistoury, partly covered with lint, or a trocar is used for perforation, and next a crotchet; but, in my opinion, the British and American perforators should be preferred, as less likely to injure the woman, or fingers of the obstetrician.

Operation.—The operator passes two fingers of the left hand to the head of the infant, and feels either of the fontanelles or openings of the head, or one of the sutures, (see *plate 2, fig. 3*), and then passes the perforator along his fingers, and into the anterior or posterior fontanelle, or through some one of the sutures into the brain, as there is great difficulty in perforating the centres, which are the most ossified parts of the bones of the cranium. (See *plate 3¹, fig. 1*). This fact is to be remembered when the body of the infant is born to the base of the skull, and craniotomy becomes necessary. (See p. 239.) The perforator ought to be introduced to the rests or shoulders of the instrument, with a semi-rotatory motion, then its handles separated, (see *plate 40, fig. 4*); the fingers protecting the uterus from its cutting edges. (See *plate 34, fig. 2*.) The instrument ought now to be closed, then opened in a transverse direction, so as to form a crucial incision. It is then closed and passed through the membranes and substance of the brain, then opened in different directions within the cranium, and finally closed and withdrawn along the two fingers.

The opening thus made admits the brain to be rapidly expelled during labour pains; the size of the head is speedily diminished; all injurious pressure made by it on the rectum, bladder, or parts lining the pelvis, is removed; and the infant is sooner or later expelled, when the pelvis is natural, by the parturient efforts alone, when they return or are excited by the ergota.

But when uterine action does not return or expel the infant after a few hours, the forceps, lever, craniotomy forceps, sharp crochet or blunt hook may be employed to make traction, and this should always be in the course of the axes of the brim, cavity, or outlet of the pelvis, according to the position of the head of the infant. When the pelvis is much deformed, it will be necessary to reduce the size of the cranium with the osteotome or the craniotomy forceps. (See *plate 34, figs. 3, 4, 5, 6, 7*). In such cases, the scalp ought to be separated from the bones by introducing the fingers between it and the opening in the head, when within reach, and one branch of the craniotomy forceps passed within the head, and the other beneath the scalp over the bone. (See *plate 35, fig. 2*). The instrument is now put in action, and a larger or smaller piece of bone is broken, which ought to be extracted along the fingers and palm of the left hand, so as not to injure the soft parts within the pelvis. (See *plate 35, figs. 1, 2*).

It is always advisable to preserve the scalp as entire as possible, so that it may cover the ragged or rough edges of the broken bones of the skull, during the extraction of the base, and prevent the soft parts of the woman from being irritated or lacerated by the splintered bones. The preservation of the scalp will also enable the nurse to fill the cavity of the cranium with paper or linen, &c., and thus preserve the rotundity of the head, so that when the infant is dressed as it always is, there may be no appearance of the operation, and no shock given to the mother.

It may be necessary to break down the calvarium or upper part of the skull, and for this purpose to introduce the craniotomy forceps a great many times, always taking the greatest care not to injure the woman. This part of the operation may require an hour or seven, (see p. 208); but simple perforation of the head can in general be accomplished in a few minutes.

When the head is considerably reduced in size, and does not pass in three or four hours after cephalotomy, the scalp and some of the remaining bones are to be seized with the craniotomy forceps, and traction made in the proper axes of the pelvis, or in that curved line on which the uterus expels the infant in natural labour. (See *plate 2, fig. 2; plate 16, fig. 1*).

The craniotomy forceps is far superior to the crotchet or blunt hook, and much less likely to injure the soft parts of the woman, for should it slip it can do no mischief. The crotchet or blunt hook is, however, sometimes applied over the petrous portion of the temporal bone, the mastoid process, occipital, foramen, ear, forehead, lower jaw, or in the occipital foramen or orbit of the eye or cavity of the ear. (See p. 239.)

When traction is attempted, either instrument may slip, and injure or lacerate the uterus, or other soft parts within the pelvis, unless carefully protected with the left hand.

The strength of the patient ought to be supported when necessary, and wine, or some spirit and warm water, properly sweetened, should be exhibited, and more or less time allowed for rest, and morphia given.

This is the practice in ordinary cases, when there is no immediate danger of the woman's life, and when she has only been twenty-four or forty-eight hours in labour, (see p. 240); and it very commonly happens that after she has slept for an hour or more, the labour pains return, and expel the body of the infant. But when there is danger of death, immediate delivery should be effected by the means best suited to the nature of the presentation. In the latter case, proper doses of the ergota, or ergot of rye should be given, to excite uterine action or labour pains, and when the powers of life are very low, double quantities of the medicine may be administered with perfect safety, for there is no danger whatever of destroying the life of the woman by such doses.

Every experienced medical practitioner is aware that ordinary doses of all medicines produce little or no effect when the powers of life are exhausted, or death approaching, and that immense doses must be given in certain cases. Most persons will experience a sedative effect from twenty or thirty drops of tincture of opium;—a person afflicted with tetanus will take sixteen times the quantity without any effect; and an opium eater will consume an imperial pint of the same preparation in twenty-four hours with impunity. One grain of calomel will sometimes cause salivation, but in some diseases I have known as much as an ounce administered in the course of twelve hours, or 480 grains without any effect. The reader will find an account of the ergot of rye, in p. 206. I shall merely add one sentence more, viz., that the ergot of rye, as administered to women in labour by a skilful medical practitioner, can never act as a poison to the woman or infant.

The great object in using it, in the above cases, is to excite labour pain or uterine contraction, for if the body of the infant be extracted, by whatever means, during the absence of the latter, the womb will be left uncontracted, and there will be very great danger of hæmorrhage, or flooding, or of hour-glass contraction, (see *plate 18, fig. 3*), which will require the introduction of the hand, and is a most painful, and often a most dangerous disease. When the placenta is retained by hourglass contraction, fatal flooding may occur, or the retained organ may become decomposed, absorbed, and in three or four days induce a typhus fever of the most putrid and fatal description. (See *Retained Placenta*.)

In cases of great deformity of the pelvis, it may be necessary to break down the base of the skull in the manner already mentioned, (see p. 235), or to use the osteotomes of Dr. D. Davis, and Mr. Holmes, or the cephalotribe of Boudelocque, *neveu*, which overcomes all difficulties relative to the size of the head, and is said to render the perforator, craniotomy forceps, and crotchet superfluous. The terebellum of Duges is capable of perforating the cranial bones, and breaking down the base of the skull. This last operation is termed cephalotripsy, and will often supersede symphyseotomy, and gastro-hysterotomy.

In former times an instrument termed *tire-tête* by the French, was passed into the opening made in the cranium with the perforator, with a view of extracting the head in its bulky form, and even Smellie delineated the crotchet applied for the same purpose; but such instruments are only useful in assisting the operator to turn the head into the long diameters of the pelvis as in natural cases, and evidently not when great deformity exists, when reduction of the head is indispensable. But when the pelvis is slightly contracted or natural,—as soon as the head is extracted, the body may be easily drawn down in the manner represented in *plate 35, fig. 3*; the shoulders and pelvis of the infant being properly adapted to the largest diameters or measurements of the pelvis, as in natural parturition by the head or abdominal extremity of the foetus. (See pp. 25, 28).

When the maternal pelvis is greatly deformed, the body of the infant must be dismembered with the perforator, craniotomy forceps, crotchet, blunt hook, osteotome, &c.; and in such cases the instruments must be introduced so often, that the soft parts of the woman are liable to be injured, so that there is as much, if not more danger to the woman as by gastrohysterotomy; and this fact often leads continental obstetricians to prefer the latter operation.

It may occupy seven hours to break down the head alone, even when the pelvis is natural, (see p. 208); and it is seldom necessary to dismember the body, unless when the pelvis is greatly deformed, (see p. 239; and *plate 35, fig. 1*.)

In such cases, the neck, clavicles, scapulæ, ribs, and limbs of the infant must be separated by means of the perforator, sharp crotchet, or craniotomy forceps, the greatest care being taken not to injure the vagina, womb, bladder, rectum, muscles, blood-vessels, nerves, and all parts in

the pelvis. It must be manifest, on a moment's reflexion, that the repeated introduction of instruments for several hours, and the extraction of the body of the infant, piece by piece, must expose the woman, when the bony passage is greatly contracted, to great danger, unless the utmost care and caution be employed by the obstetrician. My celebrated correspondent, Professor Dewees of Philadelphia, and many other eminent authors, truly observe, that embryotomy, in extreme cases of pelvic deformity, is fully as dangerous to the woman as the Cæsarean operation, (see this term.)

When the infant presents by the feet, and the body is expelled, the head may remain in the uterus; and if it cannot be extracted with the hand in the manner described in breech cases, or with the forceps, it must be perforated and reduced in size, (see p. 235.)

In such cases an assistant should press on the abdomen and fix the head, unless it is already impacted and immovable, while the operator introduces the perforator, and craniotomises in the manner already described.

As soon as the head begins to descend, or arrives at the outlet, the body of the infant should be supported on the left arm, (see p. 215), the index-finger of the left hand passed into the mouth to depress the chin on the chest, the index and middle fingers of the right hand placed on each side of the neck, (see p. 215), and traction made during a pain from the sacrum towards the pubis, (see p. 216), the left hand supporting the perineum, so that the back of the infant may be brought nearly in contact with the abdomen of the mother, (see *plate 25, figs. 1, 2*).

When any part of the neck, back, chest, shoulders, sides, abdomen, or hips present, the treatment is described in pp. 210, 211.

When the ribs present, and version cannot be effected, the perforator may be introduced between them into the chest, the ribs broken into pieces with the craniotomy forceps, or osteotome, and extracted; the thoracic and adominal viscera removed, the blunt-hook or sharp crotchet fixed on the spine, and the body divided into two parts, (see p. 210; and *plate 37, fig. 4*), or not divided, but extracted in the same manner as in spontaneous evolution, (see p. 224).

In fine I have to observe, that, craniotomy is most commonly required in cases of impacted head in first labours, occurring at an early or late period of life, when there is no pelvic contraction, (see p. 240). The labour is generally tedious in these cases, and all uterine action, sooner or later, ceases in the majority of instances, in consequence of the fear impressed on the patient by the necessity or performance of the operation.

When labour ceases after craniotomy is timely performed, and there is no danger of the life of the woman, the usual practice in these countries among scientific obstetricians is, to exhibit a cordial with a direct sedative as morphia, and leave the conclusion of the case to nature. In a few hours uterine action recommences, and generally effects delivery. This is much safer practice than to extract the infant by the crotchet in the absence of uterine action, which exposes the woman to unnecessary suffering and to hæmorrhage.

When the pelvis is natural, the passage tumefied, and the pressure of the foetal head removed by the escape of the brain after craniotomy, there is no scientific reason to extract the body of the infant during the absence of pain, unless the powers of life are sinking, or likely to do so. After allaying agitation and fear by a mild cordial, and a dose of the solution of the muriate of morphia, and allowing the patient to recruit her strength by rest and sleep, uterine action returns, in general, and expels the infant. But should this not happen, the ergot of rye must be administered, and will, if genuine, most unquestionably induce uterine action, unless there is great prostration of the vital powers, or the woman is dying. It is to be recollected, that the presence of a dead infant in the womb for a few hours, cannot be productive of any bad consequences; as dead and putrid infants are often retained in utero for weeks without producing any bad effect. I throw out these hints for the consideration of those, who advise the immediate extraction of the body after simple craniotomy, when the woman's life is not endangered; a practice that I have frequently known destructive to the patient, by the induction of hæmorrhage, and the utter impossibility to excite uterine action by any means. Many eminent writers are against delivery when there is no uterine action after craniotomy; and among these are, Simson, Osborne, Kellie, Denman, Boer, Asdrubali, Burns, Blundell, Velpeau, Duges, &c.

If there is much deformity, it is a great matter to leave the body of the infant undisturbed for some time after craniotomy, and after breaking down the skull; as the heat and moisture to which it is exposed favours putrefaction, and facilitates extraction. I have frequently witnessed illustrations of this practice.

In extracting the base of the skull through a contracted brim, we should bring it down edgeways, and first reduce it to the smallest extent with the craniotomy forceps. The perforator is next to be driven through the thorax between the ribs, and the viscera lacerated in different directions, the crotchet or craniotomy forceps applied, and the ribs and trunk dismembered in the best and easiest manner practicable. The spine, extremities, and pelvis, are also to be brought down with the crotchet or craniotomy forceps, when the deformity admits, or reduced to the smallest size, as the case may require. When the breech presents, the inferior extremities are to be separated; as also the pelvis in bad cases of deformity.

When the trunk remains in the womb after cephalotomy, which is named *décollement* by the French, we can extract it by different methods: 1, by applying the blunt hook in the axillæ or arm-pits; 2. by disengaging the arms and drawing them down; 3. by fixing the crotchet on the upper part of the spine, or between two ribs. Professors Desormeaux and Hamilton prefer the spinal column, as the ribs are apt to break, and the hook may slip; and 4, by turning or bringing down the feet.

In whatever way we operate, we must take care to adapt the largest diameters of the fœtus in relation to those of the mother, and extract in the axes of the pelvis.

Hydrocephalus.—When a hydrocephalic head presents by the vertex or base, after the body is expelled, it is to be discovered by a careful

examination. The perforator must be applied to permit the escape of the fluid; the head closes, and the labour may be terminated by uterine action alone, by the forceps, or by craniotomy.

Hydrothorax and Ascites are discoverable by fluctuation alone, and can seldom be recognized when the infant is in the womb. A trocar must be introduced, the fluid evacuated, and the labour terminated by nature, or by manual or instrumental aid.

Hydrorachitis, when large, must be punctured in the same manner, and the labour completed, according to some of the methods already described.

When there is such great deformity of the pelvis, that craniotomy cannot be accomplished with safety to the mother, the Cæsarean operation is performed in this and most countries, and symphyseotomy is performed in France, though only once resorted to in this country, by Mr. Welchman, (see *London Medical Journal*, 1790.)

Symphyseotomy.—This term is applied to the division of the symphysis pubis, which is done for the purpose of enlarging the diameters of a contracted pelvis, and of accomplishing delivery by the natural passage.

This operation was advised by Galen, next by Leverin Pineau, then by Sigault in 1768, who performed it on a living woman in 1777, with success. The Faculty of Medicine awarded the operator a medal of much value. It was now supposed, that gastro-hysterotomy or the Cæsarean section was no longer necessary; but this was soon found to be an error.

Symphyseotomy is said to be indicated, 1. when the sacro-pubic diameter measures from two-and-a-half to three inches, the infant being alive; 2. when the inferior aperture is so contracted as not to admit the passage of the hand or forceps, so that separation of the pubis may be effected, to cause enlargement of the outlet; 3. when the oblique or transverse diameters are much contracted; 4. when the head is so impacted in the cavity of the pelvis that it cannot be pushed above the superior aperture or brim; 5. when the arch of the pubis is too short or angular, and the symphysis is too long; 6. when certain tumours exist in the pelvis and impede the descent of the head; and 7, when the womb is retroverted.

Contra-indications.—Symphyseotomy is contra-indicated, 1. when the infant is dead; 2. when the pelvis measures less than two inches and a half; 3. when it is supposed that the joints of the pelvis are ossified; and 4, when the woman refuses to submit to the operation.

The great objection to this operation is, that the separation of the bones of the pubis, to the extent of one, two, three, or four inches, must seriously injure the sacro-iliac joints, lacerate or inflame them, cause them to separate to a greater or less extent, induce great constitutional irritation, and compel the woman to be confined to bed for months or years before a cure can possibly be expected or effected. Suppuration of joints is always a formidable disease, (see pp, 14, 15).

The advantage of the operation relative to parturition is, that if the pubic bones are separated one inch, the antero-posterior diameter of the pelvis will be enlarged about two lines, or one-sixth of an inch, and

so on in proportion. These results are very insignificant when compared to the dangers of the operation, which are so great as to deter British obstetricians from performing it.

The separation of the bones of the pubis cannot possibly enlarge the antero-posterior or sacro-pubic diameter, which is generally contracted. "The space which the operation gives is in the lateral direction, so that you gain no increase of the capacity of the pelvis where it is chiefly required."—*Gooch's Compendium of Midwifery*.

Operation.—An assistant is to present the instruments to the operator. The bladder evacuated, and the pubes are to be shaved. An incision is now to be made through the symphysis, bleeding vessels tied, and the inter-articular cartilage divided, some advise from above downwards, and others from below upwards. When the parts are divided so far as the subpubic ligament, due care must be taken not to injure the urethra or bladder.

As soon as the symphysis is completely divided, the labour may be left to nature, when there are sufficient pains, or may be terminated with the hand, forceps, or by embryotomy, when the infant is dead. It has been also advised to press upon the hips of the woman, to distend the sacro-iliac joints—a very improper proceeding.

The after treatment consists in placing adhesive straps and a bandage round the pelvis, so as to keep the separated surfaces in contact. Should the bladder present between the separated bones, it is to be pushed into its natural position with the finger, or a catheter. The general treatment is the same as after all capital operations, as venesection, leeching, warm baths, purgatives, &c. The reunion of the bones is said to be complete in six or eight weeks, before the expiration of which, the woman should not attempt to walk. In some cases, reunion is not perfect before the lapse of months, and sometimes never occurs; and in the latter cases, the woman can in general walk with great difficulty, while some are said to experience no inconvenience.

The following are the results of symphyseotomy according to Baudelocque:—Of forty-one women operated upon, fourteen died, and only twenty-seven recovered. Thirteen infants were born alive, and twenty-eight dead.

According to Merriman, of forty-four operated on, fourteen died, and many remained infirm for the rest of their lives.

Lauverjat gives an account of eighteen operations, the results of which were, the deaths of twenty-one mothers and infants; the Cæsarian operation was necessary in two cases; five women suffered from incontinence of urine and lameness; some women had as many as six children after the operation, and were attended by midwives only; so that, if we duly consider all the dangers, and compare them with the advantages, we must agree with Desormeaux, Velpeau, Burns, Blundell, and a host of other eminent obstetricians, that the section of the pubis is as dangerous as the Cæsarian operation, and that it should be confined to the strictest limits. I fully agree with the opinion of Professor Burns on this point, which is the general one in this country.

"There is only one degree of disproportion, then, betwixt the head and the pelvis, which will admit of the division; but the smallest devia-

tion from this destroys the advantage of the operation. Now, as this disproportion is so nice, we cannot, in practice, ascertain it; for although we could determine, within a hundredth part of an inch, the capacity of the pelvis, yet we cannot determine the precise dimensions of the head, and thus establish the relation of the two. On this account, the division of the symphysis pubis cannot be adopted, with advantage, either to the mother or child. I know well, from my experiments on the dead subject, that in the puerperal state, the articulations are soft, and we may, after dividing the symphysis, separate the bones, to the extent of three fingers' breadth, and less than this could do no good. This is invariably attended with separation of the sacro-iliac articulations, so that, altogether, the operation, even if it could be of any service in delivery, must be as dangerous as the Cæsarean section."—*The Principles of Midwifery, &c., Ninth Edition, 1837.*

It is now an established obstetric rule in all civilized countries, that no woman should be allowed to die undelivered, and that in all cases of parturition, however difficult, attempts may be made to save the lives of mother and infant, or to save the life of the one, even by destroying that of the other. However laudable may be the first part of this proposition, the last part of it, as to the destruction of the life of either woman or infant, is clearly contrary to the divine precept, "thou shalt not kill;" and I fearlessly maintain, that no case can occur in civilized society, not even homicide, in which any human being is justified in destroying the life of a fellow-being in any rank of society, more especially on account of the disqualification of such being or beings for the performance of a natural function, either parturition, respiration, digestion, &c., under any circumstances whatever.

In rude ages, the husband was suffered to murder his children, but at the present enlightened period, I am unacquainted with any scriptural, civil, statute, or other law, in any civilized country, which allows either husband or wife, or father or mother, to destroy the life of either or of their offspring, whether before or after birth. There is no law, which warrants kings, queens, legislators, judges of any court, criminal, civil, naval, military, ecclesiastical, &c. &c., or physicians, surgeons, or any class of society, to destroy, either directly or indirectly, by whatever means, the life of a fellow-subject, or any member of the human family—not, I repeat, even for the horrible crime of homicide. This is the general opinion of many of the ablest British and other statesmen, judges, theologians, jurisconsults, physicians and medical practitioners, as well as of the leading portion of our free, most powerful, and unequalled public press, and of all enlightened individuals, at the approach of the middle of the nineteenth century, A.D. 1840. Nevertheless, I am grieved to admit, that there are as yet some eminent members of the medical profession in this and other civilized countries, who maintain that the life of the infant in the womb may be sacrificed to preserve that of the mother, although they have forgotten to specify, in an accurate manner, for the best of all reasons, because they could not, the class of cases which would warrant their inhuman and unjustifiable conclusions. I feel convinced that no well-informed member of the medical profession could attempt such a classification, or precisely describe the

particular cases, amidst the human family on the face of the globe, in which the destruction of the infant would or could save the life of the mother, or *vice versa*. It is for this reason that the French, German, and most European and American obstetricians prefer symphyseotomy and gastro-hysterotomy to craniotomy, although preferred to the former operations by a majority of British medical practitioners. But so great is the difficulty in determining cases requiring any of these operations, that a consultation must always be held before resorting to any of them.

It is supposed, very erroneously, by some persons, that the husband possesses the prerogative of deciding upon the preservation of the life or death of his wife or infant, or the father of the life of his victim of seduction or concubine, and infant. I think, however, that were husband or father, to cause the death of either, he would be found guilty of murder, or infanticide, or manslaughter, according to the laws of this country. (See Author's *Medical Jurisprudence*, 1836, *Articles—Abortion and Infanticide*.)

In my opinion, a medical practitioner is equally amenable to the laws, and is never justified in consulting a husband or father concerning the preservation of the life of either wife or mother, or of the infant in the womb, as every person endowed with common sense will admit. No one but an educated and experienced medical practitioner can be a competent judge of the nature of any difficult case in midwifery, and no husband or father or any other person has the slightest right, in my opinion, to offer any suggestion as to the treatment, or as to saving of the life either of the woman or her infant—a question which must be entirely decided by medical opinion, and one on which even the most eminent of the faculty are still very much divided.

It was properly referred by the medical faculty of France to the doctors in theology at the Sorbonne, in Paris, A. D. 1648, who decided as follows, and I think correctly, according to the Bible:—"Nous sous signés docteurs en théologie de la faculté de Paris, sommes d'avis, que si l'on ne peut tirer l'enfant sans le tuer, l'on ne peut sans péché mortel le tirer; et qu'en ce cas là, il faut tenir à la maxime de St. Ambroise, —'*Si alteri subveniri non potest, nisi alter lædatur, commodius est neutrum juvare.*'"—Délibré à Paris le 24 Avril, 1648. "We the undersigned doctors in theology of the faculty of Paris, are of opinion, that if the infant cannot be extracted without killing it, it cannot be extracted without committing a mortal sin, and that in such a case, it would be best to hold the maxim of St. Ambrose,—'If one cannot be assisted without seriously injuring the other (by wound, blow, or otherwise, *scæ lædo*), it is best not to assist either.'"—Delivered at Paris, April 4, 1648. This is still the doctrine of the Roman Catholic church. Another great objection to embryotomy was, that the infant could not enter Heaven without baptism. But it was contended by Thomas Aquinas, that the infant could not be baptized in the womb, for, according to Scripture, it should first be born, that is, it should be *natus* before it could be *renatus*, reborn by baptism. This difficulty was, however, over-ruled by the Sorbonne doctors in 1773, who declared that baptism was valid if the water touched any part of the infant's coverings. They decided, "*dummodo infans sit vivus, et arte seu industria medicorum possit aqua*

ad ejus corpus immediate pervenire.”—“Whilst the infant is alive, and by the skill of medical practitioners the water is brought in contact with its body.” They might have added, or in contact with the membrane which covers it, and lines the womb, which is now considered part of the infant. It was formerly undecided whether the outer surface of the membrane, which encloses the water and infant, belongs to the womb, as it is closely attached to it, or to the foetus.

The decision of the Sorbonne doctors removed one objection to embryotomy, but admitted the former.

In this country, obstetricians are generally in favour of embryotomy, whether the infant be alive or not, as the more valuable life of the mother, they contend, ought to be preserved. It is said, “the tree should be preferred to the fruit.” But the French, German, and American obstetricians are in the favour of the Cæsarean operation. It has been performed nearly forty times in the British dominions, and only two women recovered; twelve infants were extracted alive, four of whom lived.—Barlow’s Essay, 1822; Conquest’s Outlines, 1826. Mr. Barlow’s patient was a strong, healthful country woman, whose pelvis had been crushed by a cart having rolled over it. She was already the mother of children, and not attended by a medical practitioner. She recovered from the serious injury described, became pregnant, and the Cæsarean operation was resorted to with success, for the woman was attending her usual pursuits in three weeks afterwards.

This case occurred in 1793, and was first recorded in the Medical Records and Researches, p. 154; next in Mr. Barlow’s valuable Essays on Surgery and Midwifery, 1822; and, subsequently, in Dr. Ryan’s London Medical and Surgical Journal, 1833, p. 668. Previously to the last publication of the case, I had a long conversation with Mr. Barlow, the fellow pupil of Sir Astley Cooper, when attending the lectures of Mr. Cline, and he informed me, that on the third day after the operation, he found his patient sitting up, and with her former children at a basket filled with cockles, of which all were partaking. I considered this fact, as well as others, which were omitted in the former accounts of the case, so remarkable and important, that I requested Mr. Barlow to allow me to insert them in the last named publication, then edited by me, to which he readily assented. The following is a summary of the history of the operation, and as the first successful one by a medical practitioner in this empire, is well worthy of consideration and reflection. I have had the facts of the case from Mr. Barlow’s own lips, and they will be found more minute than any account of the case published before 1833.

Jane Foster, aged forty years, of a robust constitution, the mother of several living children (number not known), had the misfortune to fall from a loaded cart, the wheel of which passed over her pelvis, as she lay on her back. This accident confined her to bed for six weeks, during which she was attended by the late celebrated Mr. White of Manchester, Mr. Hawarden of Wigan, and others. One os ilium and both ossa pubis were injured. She finally recovered, again became pregnant, and was in labour on Friday, Nov. 22, 1793, which was at the full time. The water was discharged on the second day of labour.

On Tuesday the 26th, Mr. Barlow was requested to meet Mr. Hawarden of Wigan, in consultation on the case. Mr. B. arrived a few minutes before Mr. H., and was greatly surprised that he could barely pass the finger between the ossa pubis and last lumbar vertebra, so great was the narrowness at the brim, or superior aperture of the pelvis. It was with some difficulty that Mr. B. could introduce three fingers into the outlet, or inferior aperture. He was naturally very much puzzled, and inquired of the nurse if the woman had had a living infant before? The latter replied, "Oh, yes! several, look at the children in the room." He also asked if the woman had received any injury since her last confinement or delivery, to which the nurse replied in the negative.

Mr. Barlow was now very much surprised at these statements; the woman had borne several children, who were in the apartment with her, and yet in her actual condition, it was physically impossible that a full grown infant could have ever come into the world or be born, through the ordinary passage. He now retired to another apartment, and most seriously considered this very remarkable case. After some time he heard the nurse observe, that he ought to be told the truth, or he would leave or retire, as two other practitioners had already done. He then returned to the patient's apartment, and threatened, that unless all circumstances were told to him, he would immediately take his departure. He was then informed of the accident, and proceeded as follows. The sentences in brackets were mentioned to me, but not previously published:—

"This information induced me to repeat my examination with more exactness, in order the better to ascertain the precise dimensions. Having introduced my finger again, I perceived a very evident depression of the ossa pubis, with a protuberance in a direction somewhat more towards the hollow of the sacrum, than in an exact line with the last lumbar vertebra. From this I was led to suspect that there had been, besides the fracture, a separation at the symphysis pubis, and that the protuberance just mentioned was the consequence of a deposit of bony matter at the separated part: and some idea may be formed of its quantity, from knowing that it projected to within half an inch of the os sacrum. With some difficulty I carried up my finger sufficiently high to judge concerning the degree of dilatation of the os uteri, which appeared to be considerable, as far as I could judge from feeling its anterior edge, which was thin and flabby; but no part of the infant was within reach.

"The labour pains had ceased the night before; the anxiety of the woman was very great, her pulse full, and respiration difficult. This last symptom was moderated by the loss of ten ounces of blood from the arm.

"On consultation with Mr. Hawarden, he concurred with me concerning the nature of the case, and the impossibility of bringing the infant away by the natural passage. Some little conversation passed on the propriety of a division at the symphysis pubis, but it appeared to us both, that the narrowness at the brim was too considerable to allow much advantage from such an operation, therefore that project was soon abandoned (see p. 254). The only alternative was the Cæsarean opera-

tion; but the well known danger of this induced Mr. Hawarden to decline taking any part in it, and he immediately returned home.

“ Convinced, therefore, of the impossibility of effecting delivery by any other means, it was proposed to herself and her attendants, but was not then assented to. Indeed, the idea seemed so dreadful that I did not urge it much, especially when I recollected, that of the nine or ten instances then on record (1793), in which that operation had been performed in this country, but one had furnished a voucher for its success. In this forlorn and dangerous situation the woman was left to the care of the midwife, and desired to make up her mind as soon as possible concerning the operation.

“ On the morning following [Wednesday 27th, fifth day of labour] I was again sent for, and found her lingering in the same situation.

“ She consented to the operation without the least hesitation. I immediately called in an assistant in the operation, Mr. Hawarden, a practitioner in the village (Blackrod), and brother of Mr. Hawarden, of Wigan, before mentioned.

“ The patient being taken out of bed, and placed upon a table, lying on her back, with her head raised by pillows, I began by making a longitudinal incision, five inches and a half in length, as high as the navel, parallel to the linea alba, and about two inches to the left of that line.

“ The integuments and the left rectus muscle being cut through, a small opening was made through the peritoneum at the upper part; and by means of a probe-pointed bistoury, this membrane was dilated to the same extent as the external parts.

“ It is here requisite to state, that at the commencement of the operation Mr. Hawarden was suddenly seized with a violent fit of syncope, which wholly incapacitated him from attending to the steps of the operation, and having no other professional person present, I was obliged to be assisted by a female attendant.

“ The uterus was now exposed to view, and an incision of the same length was continued through it. The infant presented with its breech, and was extracted through the artificial opening, but unfortunately was dead, yet did not show any material signs of putrefaction. The placenta and membrane were then extracted with the greatest ease through the wound. The uterus was very thin, scarcely exceeding that of the peritoneum, and equally so through the whole extent of the incision. No attempt was made to examine the pelvis from the abdominal wound. The hands of a female assistant were applied on each side of the abdomen, to prevent the admission of external air, and to press out any blood that might be diffused among the intestines, after which the sides of the wound were brought together and secured by seven sutures, over which slips of adhesive plaster were applied, and the dressing completed by a few turns of a flannel bandage round the body.

“ The peritoneum was not included in the sutures, and no part of the viscera protruded during the operation, neither were there any blood-vessels divided, which required to be secured by ligature. It was a fortunate circumstance that no hæmorrhage followed the extraction of the placenta, as was to be apprehended from an atonic condition of the uterus, the effect of long distension. The womb contracted properly,

the lochia was about the usual quantity, and continued as in other cases. The poor woman scarcely complained during the operation, so great was her fortitude. Soon after she was put into bed, she slept without taking any medicine for that purpose, and passed a good night. On the 29th she complained of a fullness about the region of the stomach, with an inclination to vomit, and on laying my hand on the abdomen, a degree of tension was distinguishable. Her tongue had a whitish appearance, and her pulse was about 120. A laxative clyster was administered with the desired effect, and the painful tension of the abdomen yielded to the stimulating effects of a blister. In short, all the symptoms which had before indicated irritation, now suffered a very obvious remission.

“[Nov. 30th. Sitting up eating cockles with her children, contrary to Mr. B.’s directions, three days after the operation.]

“Four days having elapsed since the operation, it was thought eligible to remove every other suture; on the sixth the remaining ones were taken away, and the wound appeared perfectly healed by the first intention.

“Though she had been a nurse to her other children, she experienced no uneasiness in her breasts on the present occasion. Her health continued in an improving condition until December 4th, when it received some interruption for a few days from a diarrhoea, but which was checked by an astringent mixture. On the 10th she ventured out of bed, on the 17th she began to attend to her domestic employment, [and at the end of a fortnight she went to her church], from which time to the present, 1822, (an interval of twenty-eight years) she has had a good state of health, menstruated with regularity to the usual period of life, but never has been pregnant. [She died in the year 1826].”—(*Dr. Ryan’s Medical and Surgical Journal*, 1833, No. 96, Vol. IV. pp. 568—570).

This case is replete with instruction, as no surgeon in this country had, previously to Mr. Barlow, in 1793, forty-seven years since, saved a woman by the Cæsarean operation. We must also bear in mind, that the woman was sitting up with her children on the third day after such a hitherto formidable and fatal operation, contrary to Mr. Barlow’s advice; on the tenth day she was sitting up, at the end of a fortnight she went to her church, on the seventeenth day she resumed her domestic avocations, and for twenty-eight years after the operation, she enjoyed good health, never was again pregnant, and died in 1826, thirty-three years after the performance of the Cæsarean section.

But the first successful case on record in the United Kingdom is that performed by an illiterate Irish midwife, named Mary Dunnally, who operated with a razor, extracted a dead infant, and held the aperture, while a messenger was dispatched a mile distant for some silk and tailor’s needles, with which she sewed up the external wound, and then smeared it with whites of eggs. The woman recovered in twenty-seven days. This case occurred at Charlemont, near Dungannon, county of Tyrone, and was seen by Dr. King and Mr. Stewart, who attested it on oath, and afterwards gave an account of it in the *Edinburgh Medical Essays*, Vol. V. The operation was performed in 1738.

In this case the infant was dead, and it must be admitted that the

midwife in 1738 was not skilled in anatomy, no more than all others in this country at present, and could not possibly have formed any just conception of the dangers or difficulties of the operation. But in the history of the Cæsarean section, it will appear that persons equally ignorant of anatomy were successful operators.

In all the British cases, the operation has not been resorted to until every other method was impracticable—the strength of the patients had been exhausted, and hence the chief cause of want of success. On the Continent of Europe, the operation is performed at an early period of labour, before the exhaustion of the powers of life, and on women of good constitutions, and hence recovery is so common. In this country, the operation has not been performed, unless in cases of the greatest deformity of the pelvis, and in the worst constitutions; in which embryotomy could not afford relief; while, in France and Germany it has been performed on women, who afterwards bore living children by the natural passage. In this country, the women invariably laboured under mollities ossium, and were bad constitutions, except Mr. Barlow's case; whereas, those on the Continent were generally healthful. This accounts for the great difference of success, together with the early performance of the operation.

Osborne maintained, that if the brim of the pelvis was one inch and a half at the superior strait, as in Elizabeth Sherwood's case, the operation of embryotomy was practicable. The practicability of the operation in this case is properly denied by Hamilton, Burns, Dewees, and many others. The patient died in the country, so that the exact dimensions of the pelvis were not ascertained. Any one who has performed embryotomy must admit, that he could not do so with safety to the woman, in a pelvis of such contracted dimensions. Osborne forgot the impossibility of extracting the base of the skull, or body of the infant. Dewees most truly observes that embryotomy, even in a case less deformed, is as fatal to the woman as the Cæsarean operation. This must appear obvious, when we consider the pressure which is made on the soft parts in the pelvis during the operation. The vagina, bladder, rectum, and muscles lining the pelvis, must be contused, become inflamed and gangrenous, in consequence of the pressure of the instruments; and these states have been often observed after death.

It is also a strong objection that we have no certain and no positive signs indicative of the death of the infant, except those afforded by the stethoscope and metroscope, see p. 159; and hence the European and American authors hold that the sacrifice of the infant is murder; and that in cases of extreme deformity, its mutilation will not save the mother. On the whole, the most respectable and eminent of the foreign obstetric authors are unanimous in preferring gastrohysterotomy to embryotomy. They contend, that if the former operation were performed at an early period, the woman's life would not be so much endangered as by the latter.

Professor Lizars, the eminent surgeon of Edinburgh, has frequently performed gastrotomy with success, and the wound in the abdomen healed by the first intention. Hull informs us, in a note in his valuable

translation of Baudelocque's work, that of two hundred and thirty-one women, operated on by gastrohysterotomy in this and foreign countries, one hundred and thirty-nine recovered; and the recent reports of the German practitioners are still more favourable.

Denman observed, that in cases where the infant should be invariably destroyed, a question ought to arise, whether a woman who was warned of this, again becoming pregnant, ought to be relieved by embryotomy. He, as well as Burns, Hull, and Dewees, are advocates for gastrohysterotomy, while a few others despise the "silly theological discussions, concerning the question of saving the life of the mother or infant," and agree as to the destruction of the latter. Henry VIII. was asked this question before the birth of his son Edward; and with that barbarity and cruelty, for which he was so remarkably distinguished, he exclaimed in a rage, "Save the infant, for it is easier to get wives than children." So he found it. The operation was performed on the mother, to whom it proved fatal. The same question was put to Bonaparte, by Dubois, before the birth of his son, and he answered the terrified accoucheur, "treat the Empress as you would a shopkeeper's wife, in the Rue St. Martin; but if one life must be lost, by all means save the mother."—*O'Meara's St. Helena*. Both were saved.

I have already argued in this article, that no private individual either high or low, has any right or power to advise a medical practitioner; nor has the latter any right whatever to consult a husband, or father, or mother, emperor, empress, king, queen, or any other individual, as to the destruction, or as to the destroying the life of a human being under any circumstances whatever. All the human race are equal in this respect, and there is no exception. The world would have gone as well if neither Henry VIII. nor Napoleon never existed, so far as religion, morality, and the rights of humanity were or are concerned. They were mere mortals, like the rest of their species, but somewhat differently situated, and they had, however, no more right to sacrifice the life of a human being, in a social point of view, than the humblest of their subjects. (See pp. 254, 255.)

It will, however, appear, in a succeeding part of this article, that prolicide is unhesitatingly advised by one of the most eminent British obstetricians now living, in women who require the Cæsarian operation, and also the removal of a portion of the Fallopian tube and other equally indefensible operations, to induce sterility; on the immorality and illegality of which I shall comment hereafter. (See also pp. 241, 242, 243). These recommendations are in unison with the principles of modern new lights, who would prevent generation, or destroy its products, contrary to the antiquated dictates of nature and her Divine Master. Such are the new moral world gentry; some march of intellect philosophers, and many others, who are desirous of destroying the effects of licentiousness and the proofs of infamy,—even at the horrible alternative—the destruction of human life. I have exposed the utter fallacy of these infamous doctrines, in my works on Marriage, Prostitution, and Medical Jurisprudence, already quoted; and likewise in the strictures in the concluding part of this section. But I am proud to record it, that an overwhelming majority—indeed there is only one solitary exception amongst the enlightened and learned members of the faculty,

who do not agree with me in opinion. They never have, never can sanction the destruction of the foetus in the womb, under any pretence whatsoever, not even to prevent the necessity of the Cæsarian operation. They will not do evil that good may follow. They will not commit prolicide, which is justly considered homicide according to the divine, civil, and criminal laws of this and all other civilized countries; notwithstanding the falsely imputed infidelity laid to their charge, or the large bribes which they are so frequently offered.

It is with much pain that I indite these strictures, but when I find a doctrine lightly and flippantly proposed, as will appear hereafter, by an individual whose opinion has great influence upon the rising members of the profession, both junior practitioners and students, in this kingdom and elsewhere, although diametrically opposed to that of the medical faculty in all civilized nations at present, and too well calculated to lead to the commission of the most atrocious crimes, the deaths of most women and their offspring, who may be subjected to fruitless attempts to destroy the embryo in the womb, which generally kill both woman and offspring, (see all modern works on Medical Jurisprudence), the laws of nature, humanity, religion, medicine, and of civilized society, compel me to expose and denounce its inhuman and baneful influence. I neither mean nor intend any personal or professional offence, but medical science and practice is a republic in which every member is entitled to his own opinion, and so also is civilized society. I shall also, in candour and truth, add, that there is not a member of the profession in any country, of whom I entertain a higher opinion as a practical obstetrician, than of my opponent, yet I cannot agree with him on the point under consideration. I shall adduce many additional cogent reasons hereafter, and shall therefore dismiss the subject for the present.

But reverting to the Cæsarian operation, I have to observe, that there is not as yet, so far as I know, a correct history of the antiquity or fatality of gastrohysterotomy, in any of our ancient or modern works on obstetricy; a knowledge of which is indispensably necessary to form an accurate opinion of the danger of this most formidable and fatal operation. I trust I shall therefore be excused for attempting a summary of its history.

History of Gastrohysterotomy, or the Cæsarean Operation.—It appears, by the concurrent accounts of both general and medical historians, that extraction of the human foetus through wounds in the abdomen and uterus, was accomplished at a most remote period of the world. Indeed, difficult labours must have occurred in all ages.

Hippocrates seems to have been aware of the evil consequences of preternatural labours, and accordingly advised the pelvis of the woman to be raised so that the infant might fall back into the fundus uteri, where it would have room to turn itself. *De Morb. Mulier. L. 1.* This was a useless proceeding. It was advised more than three centuries before the Christian æra, A. D. 420. Since his time, women were taken out of bed and shaken in various directions, by two or more strong men; or the presenting part was pushed back, when possible, and the operator endeavoured to bring down the head, until Parè, in the sixteenth century, introduced the operation of turning. Moschion,

an early writer, A. D. 220, gives us an account of the practice in his time; he says, "*aliæ ad scalas ligabant, et sic pendere jubebant, aliæ infinitum deambulare et salire cogeant, alias scalas ascendere, aliæ autem, manibus subaxillis missis à terra subledebant et diutius exagitant.*" Some were tied to ladders, and allowed to hang by them; others were obliged to walk and dance incessantly; while others were raised off the ground by the hands being placed under the arms, and shaken continually. Hippocrates was but very seldom called to difficult cases, and he compared the infant's head to an olive in the neck of a bottle; and he mentions instruments for extracting the foetus. He speaks of opening the head with a small sword, the bones to be broken with a pincers or forceps, and a hook passed under the clavicle, to extract the infant; here we have the operator, the pincers or forceps, and the blunt hook or crotchet. *Op. Om. a Fæsius. De Morb. Mulier, L. 1, p. 618. Celsus also described the hook, B. 7, c. 29, born A. D. 10.* Here it is necessary to advert to the more immediate consequences of difficult or laborious labours. First, we are to expect exhaustion of the woman, which, if too long continued, will end in death. Secondly, we are to expect contusion, inflammation and its consequences, suppuration, and sloughing. These are not imaginary, but real evils; or we may have rupture of the womb or vagina, transversely or longitudinally; the infant and its secundines may either partially or entirely pass through the laceration into the abdomen, or some part of the intestines may pass through the opening into the womb.

When rupture of the uterus is about to occur, the woman often exclaims: "she feels something giving way within her, or the cramp! the cramp!" The laceration may be accompanied by a noise audible to the bystanders. The labour pain then usually diminishes or ceases, the uterine tumour becomes irregular, and the feet can be felt in the abdomen; again, if the forehead be to the sacrum, and forced down in this manner, the bladder, the cervix uteri, the vagina, and the rectum, will be pressed on or inflamed, and sloughing the consequence. If the head is in the short diameter of the brim or superior aperture, the bladder and rectum will be pressed on and obstructed, (see *plate 12, fig. 1; plate 32, figs. 1, 2.*) and both may be ruptured. The bladder has been ruptured at the fundus, opening into the abdomen, or in front, posteriorly opening into the vagina at its neck; and the urethra has been inflamed and sloughed from pressure. The bladder may be distended with urine to a large size; and here a difficulty will be experienced in passing the common catheter. The head can often be passed up a little, when the pain is off, so that the instrument can be employed; if not, the delivery must be speedily effected. We should allow little drink in such cases; but promote perspiration. I have known the bladder lacerated, and a piece as large as the disc of a crown come away; yet the part healed without any treatment.

It will be perceived from these remarks, that in difficult labours, both inflammation, suppuration, sloughing, and laceration of various kinds, are to be dreaded.

The organs in all the cavities of the body may be seriously affected by difficult labours. The constant forcing down will interrupt the respi-

ration, or breathing, as well as the circulation, so that apoplexy, convulsions, epilepsy, epistaxis, emphysema of the neck and face, bronchocele, copious hæmoptysis and even rupture or other diseases of the heart may occur; numerous cases of which are on record and I have met with several. Thus the patient is exposed to most fatal diseases.

In full habits, bleeding from the arm will be often useful in tedious and difficult labours.

But to return from this digression, I have to state that it is impossible to determine the exact period in which the Cæsarian operation was first practised. It will appear in the course of this section, that it was performed among the Jews, A.M. 140. It is of more early origin, according to the fabulous historians.

It was said, that Bacchus, a son of Jupiter, was extracted from the abdomen of Semele, by Mercury. The ancient Romans held that Æsculapius was extracted in this way by Apollo. Virgil states, that Lycus was born in the same manner. Pliny was, perhaps, the first writer of authority upon this point. He flourished between A.D. 23, 79. He says, “*Auspiciatus, enectâ parente, gignuntur, sicut Scipio Africanus prior natus, primusque cæsus, cæso matris utero, dictus quâ de causâ, cæsones appellati; simili modo natus est Manlius qui Carthaginius cum exercitu intravit*” It was believed that this person took the name of Julius Cæsar, and hence the origin of the term under consideration. Bayle, however observes, that Aurelia, the mother of Cæsar, was alive at the period, when he invaded this country, and most probably had not undergone so dangerous an operation. In fact, the history of this operation is still very obscure. Craon asserts it was performed in 1424, and that the mother and infant survived. Others state it was first attempted in 1520.

It is certain, however, that the ancient Greek and Roman physicians do not allude to it. It appears by facts, that it was performed in eighty-three cases of which there were thirty-two recoveries; and twenty-four occurred from 1750 to 1800, according to Baudelocque. It was also successfully performed by Lauverjait, twice on the same woman by Bacqua, once by Le Maistre of Aix, once by Dariste at Martinique, once by Vonderfushr, in 1823 at Daplen, in 1827 at Florence, and once each by the following persons, Bulk, Græfe, Leutcz, Buren, and twice by Skenck. The operation has also been frequently performed unsuccessfully in these and other countries during the last few years. Baudelocque related sixty-three cases of this operation, in forty-two of which the women perished. Sprengel detailed two hundred and thirty-one cases, forty-five of which proved fatal; Kellie and Hull narrated one hundred and thirty-one cases, one hundred and twenty-three of which terminated fatally. There is now the strongest reason to think that incision of the abdominal parietes is by no means so fatal as hitherto supposed. The experiments of Dr. Blundell on animals confirms this position.

Indications.—The operation is necessary when the sacro-pubic diameter of the brim is reduced to an inch and a half, and even when this strait is not so much contracted, when we cannot succeed in extracting the infant by any other mode of proceeding.

When the antero-posterior diameter of the brim of the pelvis measures from two inches and a half to two inches and three quarters, the French propose the forceps, version, or section of the pubic bones, as already stated. But in such cases, the attempts made with the hand or forceps, often contuse or lacerate the vagina or uterus. The vulva, vagina, and all parts contained in the pelvis may be inflamed, swollen, indurated, or gangrenous; the womb may be entirely detached from the vagina, and the woman so prostrate or debilitated, that she may die on the slightest attempt being made to save her life. In such a case are we to attempt to relieve her, or leave her in despair? I think with most modern obstetricians, that efforts should be made to save her life; because it is utterly impossible to determine, in most cases, the exact state of the organs in the pelvis, or whether they are so diseased as to destroy life in a short time. But while ever the slightest hope remains, we are, I feel convinced, bound to operate; and M. Velpeau did so, in such a case, in 1833, contrary to the opinion of many, but with the approbation of Maygrier, Moulin, Halma-Grand, and Bientot. The woman died soon after the operation; but he still persists in believing that conscience dictates similar conduct under similar circumstances. In extreme cases, the first incision may destroy life, as was the result of a remarkable example related to the Medical Society of London, a few years since. But if all signs were fatal, and death near at hand, I should not operate; as an incision would most probably only extinguish life, when the patient is moribund. I shall, however, immediately show that women supposed to be dead for two hours were re-animated by the operation; and in one case in which version was performed, the life of the infant was saved; the mother, though apparently dead, recovered, and was alive four years afterwards.

The operation is also indicated when the pelvis is contracted in the manner already stated, and the woman more than seven months pregnant; also in those cases in which the cavity, or inferior aperture of the pelvis is so contracted as not to admit of delivery by any other means, as if there were tumours in the cavity which it is impossible to remove; and likewise when the bodies of twins are united together, and cannot be extracted on account of their size, (*vide ante* p. 223.)

The operation should also be performed soon after the death of the woman in other cases, as the infant has been saved at the lapse of twelve, twenty-four, and forty-eight hours after the mother had expired.

The Princess of Schwartzenberg died at Paris of a burn, and next day the infant was found alive. Gardien relates a similar case, in which the operation was not performed until forty-eight hours after death, and the infant was living. Cangiamila states in his *Embryologia Sacra*, that twenty-one infants were saved in this way in four years; and that the operation was performed twenty times at Syracuse in eighteen months. Numa Pompilius enacted a law, which still exists, in a work entitled *Legregia Diget*. lib. xx., which commanded the physicians to open the bodies of pregnant women after death with the intention of preserving the citizens of the state, A.C. 600. The same law prevailed in Venice in 1608 and 1721, which punished medical practitioners severely unless they used the same caution in operating on the dead as

on living women. In 1749, the King of Sicily punished medical attendants with death who omitted the operation on women soon after they expired, (see *Author's Manual of Medical Jurisprudence*, 1836.)

Ebel states, that an infant was born after the interment of the mother, whose body was exhumed in consequence of a judicial inquiry. (*Burns's Midwifery*, 1837. Several witnesses attested, that a woman who died at seven o'clock A. M., and appeared so in the evening, was found to have given birth, next day, to an infant. (*Jour. Univ. Med. des Sc. Med. tom. 7*, p. 249). Sarrois states, that a living infant was extracted two hours after the death of the mother. Jackson, Deleau, Huguier, Jolly, Duparcque, Lauverjat, Reicke, Green, Blundell, &c. have extracted living infants, by the Cæsarean operation, a few minutes after the deaths of the mothers. Dr. Blundell succeeded in fifteen minutes after the death of the woman.—(See former edition, 1831, of this work). Van Swieten, Baudelocque, and many other celebrated authors, cite cases of women supposed to be dead, who were roused from their lethargic, cataleptic, or hysterical state, by the Cæsarean section. Peu states, that in a case in which he commenced the first incision, the body trembled, the woman moved her lips and ground her teeth, to his great horror. Trinchinetti relates a case nearly similar. Rigaudeaux was summoned to a woman at Douay, whom he supposed to have been dead for two hours. Before he proceeded to open the abdomen, he judiciously examined the pelvis, found it natural, brought down the infant by the feet, and succeeded in restoring it to life in two hours. The limbs of the mother were still supple, and he properly advised that the body should not be buried while they remained so. The woman finally awoke from her lethargy, and, four years afterwards, told her surgeon she was not dead as yet. I have also recorded many singular cases of premature dissection and burial, well worthy of perusal, in another work, to which I refer the reader, (*Manual of Medical Jurisprudence*, 1836). *Art. Inhumation—Burial of the Dead*, p. 485).

When called to a woman who has suddenly died in labour, or in the last month of pregnancy, we should always examine the state of the pelvis, and when sufficiently capacious, dilate the mouth of the womb, if possible, and bring down the feet of the infant when there is the slightest chance of saving its life. I have, however, failed in such attempts, in two cases in the last month of pregnancy, and the Cæsarean section would not be allowed. The operation is much easier made than effected.

If the Cæsarian operation is tolerated, it should be performed according to the rules hereafter described, and with the same care and caution as during life.

This operation was first recorded at Venice, in 1491, by Nicolai de Falconiis. *Obs. Chirurg.* Many obstetric writers allege that it was performed by Jacob Niefer, a Swiss peasant, on his own wife. K. Sprengel asserts that it was not performed on the living subject before the year 1610. (*Geschite der Chirurgie*, 1 Theil. Halle, 1803). Deleurye, Levret, Mauriceau, and Mendel, deny that it was known to the ancients; but Joseph Plenck, Dionis, and Gardien, refer to the thirty-fourth book of Pliny's Natural History, already quoted. Rousset, physician to

Catherine de Medicis, and contemporary of Parè, collected a history of many cases performed on the living, to the year 1581 (*Traite de l'Hysterotomie*). He states that a gelder of cattle performed the operation on his wife, in Germany, in the beginning of the nineteenth century, and that she afterwards had several children in the natural way. Caspar Bauhin translated this work into Latin in 1591, and added several other cases. The operation was strenuously opposed by Parè, Dionis, and Sacombe, in France.

Dr. Mansfield, of Brunswick, published a most learned work, "On the Antiquity of Gastrotomy and Hysterotomy on the Living. Weber das Alter des Bauch und Gebarmutterschnitts an Lebenden zu Braunschweig, 1824," from which I shall make a few extracts. This erudite author and learned Hebrew scholar informs us, that in the *Thalmud*, or account of the laws of the ancient Jews, gastrohysterotomy during life is mentioned, under the article on hereditary rights. He asserts that, in an earlier work called *Mischnajoth*, published about the year 140, there is this passage: "In a twin-birth, neither the first child, which by the section of the belly is brought into the world, nor the one coming after, can attain the rights of heirship or the priestly office." In the *Nidda*, an appendix to the *Thalmud*, written in the fourth century, we find these words: "After the opening of the side, it is not necessary for women to observe the days of purification." Dr. M. has given several other passages, equally valuable, which confirm the performance of gastrohysterotomy on the living in early ages.

The operation has been performed in four different ways: 1. The lateral incision; 2. The incision in the *linea alba*: 3. The transverse; and, 4. The diagonal incision.

Rousset first accurately described the lateral incision, which was to commence under the umbilicus, and to be continued downwards and outwards, parallel to the outward edge of the rectus muscle, until the lower part of the incision was at the distance of three fingers' breadth from the *linea alba*. Levret, Stein, and Millet, recommended that the incision should be made on the side on which the uterus projects, midway from a line drawn from the end of the last rib, where it joins its cartilage to the anterior superior spinous process of the ilium; so that the incision might be two inches in breadth from the *linea alba*. This was adopted on the Continent during the greater part of the eighteenth century.

In 1721, Mauriceau advised the *linea alba* to be divided, and was followed by Guerin and Platner; the former first performed the operation in France, in 1750. Deleurye further supported this mode of operation in 1779. Henkel, a German, cut from the navel to the pubis, in 1769; a plan most generally adopted at present. Osiander recommended the lower two-thirds of the uterus to be divided. In 1788, Lauverjat cut transversely at either side, towards the spine; an operation also performed by Mr. Wood, of Manchester. (See *London Medical and Physical Journal*, vol. vi).

Stein, Professor of Midwifery at Marburg, and now at Bonn, made an incision, diagonally from the last false rib of one side, to the body of the pubis at the other; a plan which is not adopted at present. (See

the account of it in his *Geburtshulfe Abtrondlung Marburg*. 1803), which will be minutely described hereafter.

It is a curious and unaccountable fact, that the operation was more successful formerly than of late years; even during the period when it was performed laterally, having the disadvantage of situation, the danger of wounding the epigastric artery, and the unskilfulness of the operators. But it may be inquired, whether all unsuccessful cases were recorded at this period. I think not.

Klein collected an account of eighty-two cases, performed from 1500 to 1769, when the lateral operation was adopted, and six only proved fatal. Dr. Kellie published an account of the mortality of the operation in the *Edinburgh Medical and Surgical Journal*, 1809, vol. v., when out of two hundred and thirty-one cases, one hundred and thirty-nine recovered. Dr. Merriman gives an account of twenty-six cases operated on in this kingdom from 1738 to 1822, in which there were thirty deaths, and only thirteen lives saved.

During 1825, it was performed three times with success in Germany, by Schenck, Graafe, and Mende; and during the same year, three unfavourable cases were recorded in *Siebold's Journal*, and three in *Mende's Obstetric Journal*. A case is described, in which the operation was twice performed successfully on the same patient, in the *Russian Repertory of Natural Sciences and the Healing Art*, also in *Siebold's Journal*; and another, in which the operation was performed three times, by Osiander, in the *Commentations of the Royal Society of Sciences at Gottingen*, 1813. Lounius, a French obstetrician, was said to have performed it seven times on the same woman, and that all the infants lived. No modern author credits this statement.

After all that has been urged against the continental surgeons for performing the operation on women, who previously or subsequently had borne children in the natural manner, there are but four such cases on record:—one, by Nægele, in his *Erfahrungen und Abhandlungen aus dem Gebiete des Krankheiten des weiblichen Geschlechts*; another, by Henderson, in the *Edinburgh Medical and Surgical Journal*, No. 66; a third, by Meier, in *Siebold's Journal*; and the fourth, in the same *Journal*, by Berger.

Morand alleged, that the abdomen had been laid open by the Lydians. Barbette, of Amsterdam, cut through the abdomen, and disengaged a twisted intestine, in a case of volvulus. Bonetus and Schacht record similar cases. L'Aumonier, the chief surgeon at the hospital at Rouen, extracted a diseased ovary, about the year 1774. Smith, of Connecticut, lately extirpated another. Dr. Macdowal, of Kentucky, operated in three such cases, from 1809 to 1816; and Professor Lizars, of Edinburgh, in 1823: the woman sat up fourteen days after the operation. (*Edinburgh Medical and Surgical Journal*, 1824).—"It appears to me," says this most dexterous surgeon, "that there is little danger to apprehend in laying open the abdominal cavity, and that in diseased ovarium, extra-uterine conceptions, foetus in utero, with deformity of the pelvis, preventing embryulcia (embryotomy), aneurism of the common iliac arteries, or of the aorta, volvulus, internal hernia, cancer of the uterus, and foreign bodies in the stomach threatening death; we

should have recourse early to gastrotomy. The delay, in such cases, is more dangerous than the operation." (See p. 342).

One of the most extraordinary cases of Cæsarean operation on record, was that performed by a young negro on herself. This person, a servant, aged fourteen, went some distance from her residence, and was observed by her master covering something with snow, which proved to be a naked infant; on being discovered, she ran towards the house, with something hanging from the abdomen. This was the body of another infant, the head being retained by the contraction of the womb, while a large portion of intestines protruded. Drs. Basset and M'Clellan were called in, and found a diagonal wound, as to the abdomen, two inches above the navel, and another towards the sternum. The lower part of the abdomen was found filled with blood, which was removed by change of position, the wounds stitched, and a bandage applied. The girl recovered. (*New York Med. and Phys. Journ.*, March 1823).

Dr. Mosely also relates the case of a negro woman at Jamaica, who opened her side with a butcher's knife, and extracted an infant, which died of a lock jaw. The woman recovered.

Two other successful cases, in which both women and infants were saved, were operated on at the hospital at Maestricht, by M. Bosch. Both women were young, and in the prime of life. (*Biblioth. Med.* 1823.)

The operation was performed at Saltzburgh, but delayed a day, because it was doubtful whether the infant was alive or not; a decision which made all the difference between the Cæsarean section and embryotomy. The motions of the infant were perceived next day, when the former operation was determined upon. The infant was extracted alive, but died after half an hour, and the woman recovered. A reviewer remarks on this case, "we consider the above procedure on the part of the surgeon as well deserving of condign punishment, whether the woman survived or not. To perform the Cæsarean operation, in preference to embryotomy (where the latter is practicable) is most unwarrantable, and evinces a lamentable, not to say a culpable want of judgment, as to the proper estimate of the value of human life." (*Vide ante*, p. 245). The French are deserving "of this condign punishment," as well as the Germans; for M. Duges, a late writer, and many others, assert that the crotchet aigu, which is the same as the perforator, should not be employed until after the death of the infant: "nous avons dit, qu'on ne pouvait l'appliquer qu'après la mort certaine du fœtus; ne peut être appliqué que sur un enfant indubitablement mort." He likewise asserts that the Cæsarean section is the only resource in the excessive deformities of the pelvis. The Americans also deserve this condign punishment. My distinguished correspondent, Professor Dewees, late of Philadelphia, well observes, "from an attentive consideration of both operations, the crotchet and Cæsarean section, we are free to confess ourselves in favour of the latter, and for the following reasons:—First, because the infant must be destroyed by the crotchet; second, because the risks are often very great to the woman; third, because there are cases in which it is impossible to deliver with the crotchet; fourth, because where this instrument is employed, there is a great risk to the

mother, without a chance of benefit to the infant. These remarks refer to cases in which it is ascertained, or presumed, that the infant is living; if it is dead, then the crotchet may be used under a sufficient diameter of the pelvis. But if the infant is dead, and the delivery impossible by the crotchet, the Cæsarean operation should be proposed," (p. 594). He further observes, "for what reprehension, what punishment would be sufficiently severe for that practitioner, who after having destroyed the infant, should find it impossible to deliver it; and then, for its accomplishment, subject the poor woman to the Cæsarean section? He would scarcely merit the plea of *quo animo* in his favour." Par. 1479. (See Craniotomy and Symphyseotomy, as well as Gastrohysterotomy, in this work).

When we contrast the number of unsuccessful and successful authenticated cases in the eighteenth and nineteenth centuries, we shall find the results as follow:—147 deaths, 118 recoveries.

The operation is only performed in the British dominions in extreme cases of deformity, the sacro-pubic diameter being one inch and a half and upwards.

In eighty cases the following were the admeasurements in sixty-two:—one inch in 1 case; one inch and a half in 8; same and two lines in 23; two inches and a half and two lines in 25; two inches and a half and two three-quarters in 5 = 62.

From 1821 to 1830 the operation was performed in sixty-one cases, and only twenty-eight from 1810 to 1820.

In thirty-six operations in lying-in hospitals, eleven were fortunate and twenty-five unfortunate. In one practice, thirty-one succeeded out of sixty.

When the operation was performed before or immediately after the discharge of the amniotic fluid or water, the infants were extracted alive. In such cases, the proportion of women saved to that of those lost, is as 4·3.

Total of infants living 67, dead 29. The general proportion of favourable to unfavourable cases of the Cæsarean operation is 3·4.

According to M. Velpeau, from whom I quote, the causes of death were the following:—

Peritonitis and enteritis, 13; gangrene, 8; hæmorrhage, 7; effusion into the abdomen, 3; meteorism or tympanites, 3; prostration or sinking, 3; shock of operation, 2; convulsions, 2; and colliquative diarrhœa, 1.

Days on which death occurred.—1st day eight died; 2—six; 3—ten; 4—five; 5—twelve; 6—four; 7—one; 8—three; 18, 20, 27, 30, 45—one on each day.

Time of recoveries.—In 3 weeks three recovered; 4 in three; 5—five; 6—five; 7—three; 8—three; and 10 in two weeks.

It is utterly impossible, in my opinion, in the present state of science, to arrive at any positive conclusion, either as to the mortality of women, caused by the Cæsarean operation, because no two cases, constitutions, or circumstances are alike, or can be determined.

It is not quite certain, perhaps, indeed it is very improbable, that all the unfavourable cases have been recorded, but there can be no doubt

as to successful ones. M. Velpeau observes, I think very properly, that up to the present time, the Cæsarean operation has been fatal at least in one in three, if not, in one in two cases. The great majority of authors are likewise of this opinion, and a great majority agree with the sentiment of Sir Fielding Ould, of Dublin, "that to practise it is a proof of detestable, illegal, and barbarous inhumanity."—I should say, if it can possibly be avoided.

The preceding details must convince obstetricians of the great danger of the operation, and that they should never have recourse to it without absolute necessity.

As the English law now stands, the destruction of the infant is a felony, even to save the life of the mother; yet the contrary opinion is the prevailing one in this country. "In this country and in France, however painful it may be to destroy the life of the child, the mischief is considered less serious in its consequences, than the destruction (or we ought, perhaps, rather to say) the probable destruction of the mother." (*Lancet*, 1828, p. 328). Dr. Kind asserts, that in Germany, the expediency, as in this country, of destroying the child, is always left to the judgment of the medical attendant. (*Op. Cit.* p. 415. *Vide ante*, p. 245). The first quotation is not correct.

The validity of this conclusion, will be further acknowledged, when we consider the number of important parts, divided by the incisions in gastro-hysterotomy—the parietes of the abdomen; the double division of the peritoneum; the incision of the enlarged arteries, veins, and nerves of the gravid or pregnant womb; and of the substance of that organ itself, all of which may be followed by inflammation, gangrene, or hæmorrhage; especially when the powers of life are greatly weakened, or almost destroyed. The escape of the amniotic fluid, by tedious labour, as in the cases in this country, and of blood into the cavity of the abdomen, may, unless removed, induce fatal peritonitis.

It is, however, to be borne in mind, that the substance of the womb is not very sensitive, so that it has been often wounded or ruptured, without the supervention of inflammation.

The experiments of Blundell, the operations of gastrotomy performed by Lizars, and the numerous cases of penetrating wounds of the abdomen, even the intestines being transfixed, as recorded in the works on military surgery, and in Professor Cooper's valuable Dictionary of Surgery, in which recoveries took place, though there was effusion of blood and fæces into the cavity of the abdomen, clearly show, that when the powers of life are not weakened, as in the inferior animals, in women of good constitution, who are operated on in France and Germany, but rarely in this country; or in soldiers who are well fed, that gastrotomy is by no means so fatal, as gastro-hysterotomy in women of the worst constitutions, suffering from osteomalaxia, who are greatly exhausted by long continued labour-pains, and who are too often, indeed generally sinking before the operation is commenced, which has almost been hitherto the case in this kingdom, except in Mr. Barlow's solitary example, or perhaps the case of Mary Dunnally, already noticed.

Ancient and modern Modes of performing Gastro-hysterotomy, or the Cæsarean Operation.—Some of the first operators, as Rousset,

Ruleau, Platner, &c., made an oblique incision from the left side to the right, sometimes a crucial one (Peu), or a compound one (De la Riviere), but always outside the right muscle. They said, that by these methods, there was no danger of injuring the bladder; that the cicatrization would be facilitated, as also the escape of matters from the wounds. But the objections to these modes of operation are, the danger of wounding the epigastric artery or its branches, the impossibility of retaining the lips of the external wound in contact, on account of the retraction of the oblique and transverse muscles, and of keeping the wounds in the abdomen and uterus parallel to each other. Moreover, the side of the womb would be divided, and the vessels in this part are so large, that fatal hæmorrhage might be the result. The left side was preferred by Guy de Chauliac, because it is more empty than the right, on account of the presence of the liver. But it is to be borne in mind, that the uterus may be pressed towards either side by the contortion of the pelvis, and hence the modern rule is, to operate on the most prominent side through the linea alba or median line, in which there is no muscle, but common integument, fascia, and peritoneum. This course is now preferred in France, Germany, and this country, and was first proposed by Mauriceau, others say, by Platner, Guerin, or Varaquier.

The advantages in making the incisions in the course of the linea alba are, few parts are divided, there is slight pain, the muscles are avoided, there is no artery wounded, and the womb is divided in the course of its principal fibres. Even this mode of operation has also its disadvantages. If the first or second incision be prolonged too much, the bladder may be wounded; the positions of the wounds are not favourable to the discharge of fluids through the openings, after the operation the incision of fibrous or aponeurotic tissue is slow in cicatrizing, is said to become gangrenous, though this state seldom occurs after tapping for dropsy in this part; while the division of the womb on its anterior surface will cause the separation, instead of the approximation of the lips of the wound. Notwithstanding these objections, this mode of operating is now generally preferred. Lauverjat made a transverse incision in the right side towards the spine, which divided the fleshy fibres of the external and internal oblique muscles, so that the edges would retract, and the least effort force out the viscera, giving rise to ventral hernia, while the transverse incision of the womb at its fundus, in which the vessels are large, would be followed by hæmorrhage, as well as that caused by the division of the epigastric artery or its branches. Gardien and Sabatier are in favour of this operation, while Velpeau, Hatin, Blundell, and most moderns, are against it—and with these I agree in opinion. It must be obvious almost to every one that the disadvantages of the lateral incisions, in whatever direction they may be made, are very great: 1. There are three layers of muscles divided, the different courses of which offer great obstacles to the cicatrization of the external wound; 2. the epigastric and principal arteries of the womb on either side will be wounded, giving rise to serious or perhaps fatal hæmorrhage; 3. the fibres of the womb will be incised obliquely and transversely, which will cause the lips to gape instead of approaching each other, and allow an effusion of blood or lochia into the cavity of

the abdomen, thereby predisposing to, if not causing, fatal peritonitis or enteritis. These objections may also be made to similar operations of the Germans, as of Stein, Zang, Joerg, and Ritzen, the last of which deserves a brief notice.

Ritzen proposed, in 1820, to make an incision above the crest of the ilium, to separate the peritoneum, to incise the summit of the uterus, and extract the foetus. This proceeding was proposed with a view to avoid wounding the peritoneum; but the operator forgot that he divided the peritoneal coat of the uterus.

M. A. Baudelocque considered the great danger of the Cæsarean operation arose from the double incision of the peritoneum, and regarded wounds of the uterus essentially mortal, which was by no means the fact: and he therefore proposed, in 1823, a new operation, which consisted in an incision from the spine of the pubis, parallel to Poupart's ligament, and extending to the superior-anterior spinous process of the ilium. He selected the left side on account of the inclination of the neck of the womb, when the organ was inclined to the right; and the right side in the contrary case. After having made his incision, he detached the peritoneum off the iliac fossa, opened the superior part of the vagina, and hooked down the uterine orifice to the wound in the abdomen, now left the labour to the contractions of the womb, and extracted the foetus, if necessary, with the hand or the forceps. He called this operation *elytrotomy*, and has repeatedly performed it upon the dead subject. But the proposer of it, on a recent occasion, after having attempted it, was obliged to have recourse to the ordinary operation through the abdomen.

Dr. Physick had previously proposed to make an incision above the pubis, as the peritoneum was easily separated from the bladder.

The operations of Dr. Ritzen and Dr. Physick have not been performed on the living subject, and, like that of M. A. Baudelocque, ought to be entirely abandoned.

The method of M. Velpeau deserves attention. His incision through the abdomen corresponds to the side of the uterus which is most prominent, which is generally, if not almost always, to the right, before the rupture of the water, and after its escape, along the linea alba. When the womb is prominent, he thinks it best to make the incision obliquely, from above downwards, and from without inwards, as was done by Mr. Abernethy, to tie the iliac artery, which is better than to make it vertically. The incision in the womb is semilunar, which facilitates the passage of the infant, closes more rapidly afterwards, and can be made in the part which is most convex, and contains fewest blood-vessels.

Some say that it is an advantage to have the membrane, which surrounds the foetus, perforated or ruptured, as the effusion of the amniotic fluid cannot take place into the abdomen. Others contend that when the membrane is entire, it is easier to extract the infant; that the wound in the uterus will be less extended, and much more reduced by uterine contraction. Such is the opinion of Desormeaux and Velpeau; and it seems to be valid.

The rectum and bladder should be evacuated previous to the operation.

Instruments and necessary Apparatus.—Two bistouries, a common convex one and a button-pointed one, an artery forceps, a pair of scissors, and some needles threaded, are sufficient for this operation. The remaining apparatus which will be required comprises a fine sponge, some lint, long and square compresses, the body and scapular bandages, and basins of cold water, with a little vinegar, wine, and eau-de-Cologne.

In addition to these, there should be adhesive plaister, cerate spread on lint, a syringe, a gum elastic tube, in case it become necessary to inject warm or cold water into the uterus, a practice not adopted, or at least very seldom so, in the British dominions.

The linea alba is the situation now selected for the operation.

The uterine orifice must be dilated to some extent before the Cæsearean operation is resorted to, in order to afford a passage to the blood, to its clots, and to the lochia.

Preliminary Cares.—If the woman is at all plethoric, it would be advisable to take away some blood; and at all events to open the bowels by a clyster, evacuate the bladder, and shave the pubis.

If she is excessively nervous, hysterical, or irritable, she should be placed in a warm-bath, or the abdomen fomented with some warm fluid, and some antispasmodics and cordials administered to her. The preliminary preparations should be the same as for all great operations.

Temperature of the Apartment.—Monro, Aitken, Sarrois, and others, supposed that the application of the atmosphere to the cavity of the abdomen when laid open, caused peritonitis, an opinion now exploded. Nevertheless, the temperature of the apartment, according to Professor Lizars, should be about 90° Fahrenheit, or only a few degrees below that of the internal parts of the body. M. Sarrois proposed to perform the operation under warm water, while the woman was in a bath, but this method has never been adopted.

Position of the Woman.—The patient ought to be placed on her back near the edge of the bed, which should be covered over, on account of the subsequent discharges, the head and chest slightly raised; the inferior extremities extended during the time of making the incisions; and half bent during the extraction of the foetus. In order to render the abdomen more prominent, a pillow is placed under the loins.

Dr. Blundell also advises “the recumbent position near the edge of the bed, with the head and shoulders a little elevated, and the legs lying forth beyond the bedstead, so as to hang upon the floor.” (*Blundell's Obstetric Medicine*, by Lee and Rogers, 1840)

In my opinion, the positions previously mentioned, as regards the inferior extremities, are very much preferable.

The thighs and legs should be held tightly, as previously directed, by two assistants appointed for that purpose, so as to prevent their sudden movement during the pain caused by the incisions.

Position of Assistants.—Two other intelligent assistants should apply their hands on the sides and fundus of the uterus, so as to circumscribe it exactly, and retain it in the middle of the abdomen, at the same time preventing any portion of the intestines, or other viscera, from sliding down between the surface of the womb and parietes of the abdomen.

(See *plate 12, fig. 1*; *plate 36, figs. 2, 3*). The naked hands are generally applied for the last named purpose; but MM. Walther, Kluge, and Velpeau, advise a large sponge to be placed under each hand, which may be dispensed with in most cases, if not all; indeed, I do not perceive the utility of this contrivance. The application of the naked hands of assistants (as represented in *plate 36, figs. 2, 3*), will be quite sufficient for all useful purposes, in most cases. Other assistants are to hand the instruments to the operator, and aid him when necessary.

Operation.—The obstetrician makes an incision in the direction of the linea alba, with the convex bistoury, of about five or six inches in length, from the umbilicus, or even a little above it, to within an inch and a half of the pubis, according to Baudelocque, in order to avoid wounding the bladder, and also as the abdominal parietes are thick near the pubis. If the incision is commenced above the umbilicus, it should be carried at the left side of this part, to avoid the umbilical vein, and the anastomosis between it and the epigastric vein, as recently described by Mesnière, Clément, and Martin.

When the incision is made high above the navel, it is possible to incise the uterus in its most elevated part, and thus to prevent the effusion of the lochia into the abdomen. The first incision ought to be made through the skin and subcutaneous cellular tissue only. The linea alba is next to be divided, some say from below upwards. The peritoneum should now be opened with the sharp-pointed bistoury, and the opening is to be enlarged with the blunt-pointed instrument, conducted along the left index finger, in the same direction as the wound in the skin, from above downwards, and from within outwards, (see *plate 36, fig. 2*). The uterus is next to be depressed by an assistant, and incised from the superior to within an inch of the inferior angle of the abdominal wound, which is an extent of about six inches. This incision is commenced with the sharp, and terminated with the blunt-pointed bistoury, which is used from within outwards, and from above downwards. The substance of the womb should be gradually divided to the membrane which covers the foetus, and so as to preserve the length of the cervix or neck, as much as possible. The membrane is to be pierced with great caution, in the same manner as the substance of the womb. At this moment the assistants should keep the parietes of the abdomen in close contact with the womb, so as to prevent the effusion of the amniotic fluid or water, on the membrane being pierced, into the peritoneum; and also to prevent the tendency of the viscera to escape through the wound in the abdomen. According to Planchon the membrane should be ruptured through the vagina, to prevent the escape of the liquor amnii into the abdomen; but this is not done at present.

Extraction.—When the uterus is divided, the foetus is to be extracted by the feet, head, or breech, as each of these parts presents, with the same caution as in labour through the natural passage, care being likewise taken not to contuse the edges of the wounds.

It is said we ought to avoid wounding the placenta in dividing the uterus: but the position of it can only be determined previously by the stethoscope, which is now denied. The placenta, membrane, and navel cord, are to be extracted through the wounds, the womb is to be cleared

of all clots, a finger is passed through the vagina and neck to facilitate the escape of any that may be there; and the finger should be occasionally introduced through the os uteri for that purpose, after the operation: no pieces of sponge or lint are now placed in the cavity of the womb, as formerly advised.

If any large vessels are divided during the operation, they are to be pressed only by the assistants, and secured by ligatures. Some authors of past centuries, as Heister, Deleurye, advised the application of vitriol, spirit of wine, vinegar, &c. to the mouths of the bleeding vessels of the womb; a practice, I believe, no longer followed. It is better to cause the organ to contract, by means of gentle friction, when necessary, though this is seldom the case, unless the woman is dying, as it rapidly contracts, in most cases, after the extraction of the foetus and its appendages, it rapidly descends into the cavity of the pelvis, the intestines falling over it. It is on this account Dr. Blundell advises that the abdominal incision should not be made above the navel, as in such cases, after the womb has contracted, the intestines protrude very freely, the placenta may be divided, and the womb sink below our reach. *Op. Cit.*

When the uterus does not contract, we should make gradual pressure, and exhibit the ergot of rye in the manner already mentioned.

Treatment after the Operation.—The chief indications are, to arrest hæmorrhage, and remove all clots of blood and liquor amnii from the cavity of the abdomen, and to prevent inflammation. The wound in the uterus requires little care, as it will speedily contract to an inch or two, and cicatrize or heal of itself.

The abdominal or external wound is reunited in England, France, Germany, and most countries, by means of sutures, or stitches, which are not passed through the peritoneum, according to Barlow and Blundell, although the latter passed them in his valuable experiments on rabbits with safety and impunity.

Sutures are to be passed through the abdominal wound, except at the inferior part, which must be left open to favour the escape of fluids from the uterus and abdomen. Before applying sutures we must remove all fluids from the abdomen, whether blood or amniotic liquor, by changing the position of the patient, using tepid injections of warm water, and pressing upon the sides of the abdomen. Capuron objects to sutures, as they may be displaced by tension of the abdomen when peritonitis occurs. The sutures are, however, in general preferred to agglutinating or adhesive bandages. I agree with the late celebrated French professor, M. Desormeaux, whose valuable lectures I attended, that sutures alone can retain the edges of so large a wound in mobile and flaccid parietes, such as those of the abdomen after delivery. The wound is to be covered with lint, and the body and scapulary bandages applied. Some prefer adhesive plaister. The dressing is to be changed frequently during the first twenty hours, then morning and evening, if we suspect effusion. We should prevent adhesion between the uterus and abdomen, according to Bacqua, Capuron, Gardien, &c., as it would expose the woman to dragging sensations, hæmorrhage, &c.

General Treatment.—This is the same as after all capital operations

in surgery: the soiled clothes should be removed, the patient kept as quiet as possible, an antispasmodic and sedative draught exhibited to tranquillize nervous agitation, and the shock inflicted upon the system by the operation; the diet should be low, the bowels regulated, and antifebrile medicines, such as saline diaphoretics, diuretics, &c., administered. All the muscles concerned should be relaxed as much as possible.

The woman should be carefully watched, lest peritonitis supervene; and the antiphlogistic regimen must be strictly employed, if the symptoms of inflammation occur. M. Gardien and others advise the woman to suckle her infant, as a means of counter-irritation to that of the abdominal organs. When a cure is accomplished, the woman should wear a bandage, to prevent ventral or abdominal hernia, popularly termed rupture, the size of which is often very considerable, indeed the greater portion of the intestines may protrude, and greatly endanger life. I have already detailed the beneficial and mortal results of gastrohysterotomy, or the Cæsarean operation, which well deserve the most mature consideration and reflection from practical obstetricians, as well as all medical practitioners. (See p. 270).

The fatal results are so great, that some modern obstetricians of eminence have gravely proposed to excise a portion of either Fallopian or uterine tube, or the whole uterus, when the abdomen is laid open, and before inserting the sutures, for the purpose of inducing sterility. This proposal requires to be rigidly examined, on moral, social, and medical grounds. (See p. 261).

Two obstetric authors of eminence have proposed operations for the prevention of future conceptions when gastrohysterotomy has been performed. These proposals are, in my opinion, untenable in a moral point of view, and have never been hitherto adopted. Michaelis proposed to prevent future conceptions and the necessity of the Cæsarean operation, and to avoid a very great reaction, by which, I presume, he means conjugal dissension and infidelity, to extirpate the uterus (*Kilian, Op. Cit.*); and Dr. Blundell not only sanctions this operation, but also proposes a substitute, viz., the removal of a line of the Fallopian tube, right or left, so as to obliterate its calibre—the larger blood-vessels being avoided: mere division of the tube might be sufficient to produce sterility; but the further removal of a portion of the tube appears to be the surer practice. I recommend this precaution, therefore, as an improvement of the operation. (Work, by Lee and Rogers, 1840, already quoted, p. 359).

I cannot admit the correctness of this physiology, because it is on record and well authenticated, that a woman who had but one ovary and uterine tube, and who was found to possess no more on actual dissection, not only was not sterile, but was the mother of infants of the different sexes. No less an authority than M. Velpeau asserts this fact from actual dissection.

It therefore clearly follows, that obliteration, or even absence of one Fallopian or uterine tube, or even the absence of one tube and ovary, neither might nor can produce sterility. It is equally well known, that a man who has one testicle destroyed by disease or removed by castra-

tion, may beget offspring of both sexes, proofs of which will be found in all the standard treatises on Medical Jurisprudence of modern times.

I am perfectly at a loss to perceive upon what moral or physical grounds, women who may or may not be deformed, are to be rendered sterile by surgical operations, or other means, and men exempted, though really the sources from which our race is perpetuated. This is not according to the laws of nature. I shall not dwell further upon this subject, as its various bearings would lead me into a long digression, and more particularly as I have discussed it elsewhere (see *Philosophy of Marriage*), and shall only add, that perhaps at some future period, during the rapid march of intelligence and knowledge, it may be gravely proposed to emasculate or render sterile all husbands and others, whose wives or mistresses may have been subjected or liable to, the performance of the Cæsarean operation.

The removal of the womb, if justifiable, which I strongly deny, though much more dangerous, and so fatal, that even when the organ is incurably diseased, has been totally abandoned of late years, would be a more effectual preventive; but even this remains to be proved, as every one knows there are extra-uterine conceptions. I cannot here enter upon physiological discussions, which would be out of place, but I refer the interested reader to the account of generation in a preceding chapter.

I am well aware that the womb, when diseased, has been cut away, and also after delivery absolutely torn away by ignorant practitioners, and even separated during the action of the bowels or bladder; but such cases are not in point, and do not relate to the question under consideration. (See p. 184).

That question is this, is it right or moral to use any means or operation to prevent procreation? I boldly answer in the negative—because any such means or operation prove a doubt in the minds of those who employ them, of the omnipotence of Divine Providence, and of his power to preserve the human race. The induction of abortion, to destroy the life of the foetus, is a felony according to the laws of this country, and is considered homicide by the most eminent of the medical faculty in all countries.

The following proposals by Dr. Blundell have not been as yet tried, so far as I know, nor are they ever likely to be sanctioned by the profession, on account of their danger.

“Now, is there any other mode in which, when the obstruction of the pelvis is insuperable, the formation of a foetus may be prevented? In my opinion, there is. If a woman were in that condition, in which delivery could not take place by the natural passage,—provided she distrusted the circumstance in which she was placed,—I would advise an incision (of an inch in length) in the linea alba, above the symphysis pubis. I would advise further, that the Fallopian tube (on either side) should be drawn up to this aperture; and, lastly, that a portion of the tube should be removed;—an operation easily performed; when the woman would, for ever afterwards, be sterile. All this may be done after due consideration;—circumstances not forbidding. ‘But the abdominal inci-

sion;—that is bad.' True; but the Cæsarean incision;—that is worse! Is not that true also?

“*Destruction of the Ovum.*—If a woman, in the earlier months of pregnancy, be known to have a pelvis contracted in a high degree, is there nothing which you may then do to prevent an ultimate need of the Cæsarean operation? Abortive medicines might, in this case, be thought of; or, these failing or rejected,—if you could feel the os uteri,—you might introduce a female sound, or any other instrument of that kind; and, passing this sound into the uterine cavity, you might completely break up the structure of the ovum, so as to prevent the progress of generation. In doing this, there would always be a risk of hæmorrhage; but where you are endeavouring to avoid the necessity of the Cæsarean incisions, this risk would be justifiable. The substitution of the smaller evil for the greater, is frequently the principle of the healing art. But what if the os uteri be inaccessible? Is there, in such a case, any other expedient to which we may have recourse? In a case like this, were my opinion consulted, I should be inclined to reply,—‘As a substitute for the Cæsarean operation, let an incision be made as before, above the symphysis pubis; then let some instrument (such as a trocar, or canula) be carried into the cavity of the uterus; let this instrument be sufficiently stiff to enter the cavity, and retain its form there under pressure; and then let it be resolutely moved about in the uterus, so as to break up completely the texture of the ovum. The whole instrument need not be much thicker than a bell-wire. The process is allied to that of acupuncture. The point of the trocar, on entering the uterus, should be withdrawn with the canula; a finger should be carefully placed on the uterus, so as to guide the instrument, and guard against injury of the intestines or the bladder.’ Scribblers had better content themselves with sneering at the operation;—surgeons had better perform it!—*Artem quisque suam!* To produce future sterility, the Fallopian tubes might be rendered impervious.”—*Op. Cit.*

All these proposals are liable to the most serious objections. The recommendation of destroying the ovum or fœtus in the womb by so high an authority, may so influence many junior members of the profession, as to lead them to attempt to accomplish it in cases of illegitimate pregnancies, and render themselves liable to criminal proceedings for felony, punishable by long imprisonment, flogging, transportation for different periods, and in some cases, by an ignominious death. (See Author's *Manual of Medical Jurisprudence*, second edition, 1836; see also pp. 241, 242, 243, 254, 255, 261, 262).

The induction of premature labour is effected for the purpose of saving the life of the infant, preventing the necessity of craniotomy and the Cæsarean operation, and thus saving the lives of both mother and infant, is a laudable and humane proceeding, the most contrary to that under consideration, which is, in my opinion, properly considered, most reprehensible and penal. (See p. 240).

The mode of inducing premature labour I described in a dead language, to prevent, as far as possible, its being practised for criminal purposes. (See p. 240). As to the above quotation, he who runs may read; but, fortunately, the description is so general and vague, that few,

if any, could succeed in breaking up the ovum without more or less injuring the mother, and most probably destroying her life, as well as that of her innocent and unoffending offspring.

The orifice of the womb is inaccessible in the early months of pregnancy (see p. 155), and no instrument can be passed into it. It is for this reason that we are advised to resort to other operations, nearly as dangerous as the Cæsarean section, which, though tried on inferior animals, have never been attempted on the human female, nor never can be, by any one who properly values the rights of humanity, and his professional reputation. They may appear very ingenious and bold in a lecture-room, to novices who are incapable of forming a correct opinion on the subject, or to practitioners unacquainted with the histories of gastrotomy and gastrohysterotomy, but certainly not to learned and experienced obstetricians, who will and must avoid them. Here I must add, in conclusion, the old adage,—“*Amicus Socrates, amicus Plato, sed magis amica veritas.*” Socrates is a friend, Plato is a friend, but truth is a greater friend.

Vaginal Hysterotomy.—Many cases, according to authors, require vaginal hysterotomy, as a fibro-cartilaginous state of the os uteri, (Simeon, Van Swieten, Hamilton); violent convulsions, without dilatation of the uterine orifice, (Dubosque and Lambron); obliquity of the uterus, (Hamilton, Dewees, &c.); the head of the infant pushing the uterus to the vulva, (Lauverjat, Hamilton, Monro, and Farquharson); and when the uterus escapes through the pelvis, and its orifice cannot be dilated with the fingers, (Thenance, Jacomet); and in cases of extra-uterine foetation, (see p. 244). Some recommend several incisions in these cases, others, a simple incision; and Duges advises us to remove the scirrhus parts. This operation is seldom performed, though it is evidently less dangerous than gastrohysterotomy.

If hæmorrhage supervene, it is to be arrested by cold injections, plugging the vagina, or cauterization made through a speculum; so that due care must be taken not to wound the bladder, vagina, or rectum.

Existence of Tumours of various kinds in the Cavity of the Pelvis, impeding Parturition, and requiring diminution or removal.—Tumours of various kinds may be developed in the cavity of the pelvis, and be of such a size as to impede delivery. These may be osseous, ovarian, glandular, sebaceous, polypous, &c. &c. Some are loosely attached and easily removed; but others are solid, and removed with so much difficulty, that craniotomy, or the Cæsarean operation, has been proposed and performed in extreme cases.

Professor Burns, of Glasgow, one of the ablest, most astute, learned, and practically experienced of living obstetricians, very judiciously proposes, in my opinion, to puncture with a trocar all tumours supposed to contain fluid; to remove all loose, and even solid ones, when this can be effected with safety. (See also cases by Jackson, Peletan, Park, Meriman, D. Davis, quoted by Dr. Burns in his elaborate *Systematic Treatise on Midwifery*, 1837).

Some of these tumours are easily removed when slightly attached, or by a small pedicle or neck, and this should be accomplished whenever practicable. But others are so firmly attached, and by a broad base,

that they can only be excised with difficulty and danger, or not at all. In the latter cases, the incision is made through the perineum and levator ani, as in lithotomy. The first successful case of this kind was performed by Dr. P. P. Drew, of Fermoy, Cork, and is reported in the *Edinburgh Medical and Surgical Journal*, 1804, and copied into the *London Medical and Physical Journal*, 1805, vol. xiii. In the first case, about which Dr. Drew was consulted, a very large tumour, so pressed upon the urethra and rectum as to render both passages impervious. A consultation of four surgeons was held on the case, and as the majority were of opinion, that the morbid growth might be connected with the large blood-vessels in the pelvis, any attempt to excise it was abandoned, and the woman died of convulsions.

On examination after death, the tumour was found unconnected with the large blood-vessels, and but slightly attached to the sacro-sciatic ligament. Its tissue was fat and gristly. These facts led to the conclusion, that such tumours might be safely removed by incision of the perineum, &c.

About six months afterwards, a similar case occurred to Dr. Drew. The extraction of the tumour, or the Cæsarean operation, was required, according to the opinions of four surgeons. The former operation was preferred, and performed by Dr. Drew; a living infant was born, who, with the mother, was well at the time of the report of the case.

Dr. Burns has subsequently performed a similar operation with more difficulty, but with success. There was little blood lost; the labour-pains increased, and in four hours the woman was delivered of a still-born infant. Peritonitis succeeded, but was finally subdued. When the parts were healed, no one could suspect that any operation had been performed. The woman survived for fifteen years, but had never again been pregnant.

Pelvic tumours may vary in size, and cause various degrees of encroachment, which may, however, admit of the use of the forceps or perforator after the death of the infant. I lately attended a case of the latter kind with Dr. Brooke, of Keppel Street, Russell Square, which required craniotomy. The woman recovered.

Dr. Burns offers the following very judicious practical remarks on the cases under consideration:—

Whenever the tumour is moveable, it ought to be pushed above the brim of the pelvis, during the absence of the labour-pain, and prevented from again descending before the infant's head. The same practice should be adopted in cases of hernial or dropsical protrusion, and I have often found it successful.

The labour should not be allowed to be protracted in cases of pelvic tumours, because the pressure would destroy the infant, and finally the mother, either by exhaustion, hæmorrhage, rupture of the uterus, inflammation, &c.

A case lately occurred in Dublin, in which Sir Philip Crampton, Bart., Dr. Beatty, and other eminent physicians and surgeons, considered it most prudent to allow the pressure of the infant's head to separate or force away the tumour, and this was accomplished without hæmorrhage, or any bad consequence.

It has been proposed to cut through the abdomen, to remove certain

tumours in the pelvis which impede delivery; but I am not aware that the operation of gastrotomy has been hitherto performed in such cases in this country. The cases reported by Professor Lizars were unconnected with parturition, though very strongly bearing upon those cases connected with that function, which gave rise to the preceding remarks. (See Gastrotomy hereafter, and also p. 271).

The extirpation of the tumour, when practicable, or its reduction by tapping, is always to be preferred to craniotomy or gastrohysterotomy; but in some cases incision cannot be practised when firm cohesions have been contracted between the tumour, the vagina, or rectum.

When there are extensive cohesions, a danger of hæmorrhage, failure of tapping or puncture, and impracticability of extirpation; perforation of the head, or extraction of the infant, should be accomplished by some means or other.

In extremely bad cases, in which all other means are useless, the Cæsarean operation should be performed, in the manner already described. (See p. 275).

But besides the tumours already mentioned which may cause encroachments on the cavity of the pelvis, there are many other causes which well deserve attentive consideration. There may be exostosis of the sacrum, or of any part of the internal surface of the pelvic bones, enlarged ovary from whatever disease, either fluid, solid, or bony, falling between the vagina and rectum; as also descent of intestine, fluid in dropsy, and even the presence of gas or air, as it is popularly termed, together with enlargement of the lymphatic glands in the same situation. The relative position of recto-vaginal tumours will be readily understood by reference to *plate 3, fig. 2; plate 12, fig. 1.*

The most common of such tumours are, I believe, ovarian, and these may be fluid, pulpy, or solid, as in incipient dropsy, when the fluid will be thin or watery, or chronic, when it will be gelatiniform, somewhat similar to starch mucilage, or glue when cooling; scirrhus of the ovary, and other morbid enlargements, some of which, even in the virgin state, inexplicably containing different parts of the human foetus, as teeth, bone, hair, &c. (See Diseases of Women, hereafter).

I have already observed, that it has been proposed to puncture or incise certain recto-vaginal tumours through the rectum; but it is to be recollected that great care should be taken, lest a fold of intestine may lie in the way, and be punctured.

Professors D. Davis, Lizars, and others, have suggested gastrotomy for the purpose of removing certain pelvic tumours; but the operation has not been, so far as I know, hitherto performed in this country during labour.

In recapitulation, I have to state, that the principal practices in pelvic tumours are to allow the natural efforts a fair trial, or to press the tumour above the brim of the pelvis; to deliver by version, the forceps, craniotomy, gastrohysterotomy; on the bulk of the tumour being reduced by puncture, incision, or removed by extirpation.

It most unfortunately happens, however, that the results of all these operations are nearly as unfavourable to human life as those of craniotomy and hysterotomy.

In one case, the tumour was pushed above the brim of the pelvis, delivery took place, and both mother and infant survived.

In four other cases, the tumour was laid open by puncture or incision: in the first, the woman recovered with difficulty; in the second, she recovered imperfectly; in the third and fourth, the woman died, one in six months after the operation. Three of the four children were saved. Five of the eight lives were preserved, and three lost.

In seven other cases, in which embryotomy was performed, one woman recovered, another imperfectly, and five died. All the infants were of course lost. Of seventeen lives (for one was a case of twins) three only were saved, and fourteen lost.

In five cases of version, or turning, four of the women died, as well as all the infants. Thus of ten lives, one only was saved, and nine destroyed.

In three cases, in which the tumour was punctured and the head perforated, one woman recovered; the other two died, as well as all the infants; so that of six lives only one was saved.

The reader will find many very interesting cases by Mr. Parke, of Liverpool, in the *Med. Chir. Trans.* vol. ii.; by Dr. Merriman, *Op. Cit.*, vol. x.; by Dr. Hemming, in the *Edinb. Med. and Surg. Journ.*, vol. xxxv.; and in the last writer's translation of the valuable work of Mad. Boivin and Professor Duges on Diseases of the Uterus and its Appendages; and also by Dr. Ashwell, in Guy's Hospital Reports, 1835-36.

The judgment of the obstetrician alone, but, whenever possible, guided by that or those of the members of a consultation, must determine the operation to be performed in any given case. I need scarcely observe, that there is great danger threatened to the lives of both mother and infant in the cases under consideration. Hence the necessity of a second opinion, whenever it can be obtained; and of every practitioner when acting alone, consulting the best standard works on the subject. But it now rarely happens, in most towns or villages, in consequence of the great increase of the medical faculty within the last few years, that there can be a want of second opinion when required; and I repeat, emphatically, that it ought to be obtained when possible.

The lives of two fellow-creatures are at stake, as well as professional reputation or fame,—on which medical success very much depends.

In fine, there never can be a want of a consultation, in most situations, either in cases of rich or poor, when the faculty are actuated by the golden rules of Christianity, which are the real basis of medical etiquette, and professional conduct.

Gastrotomy.—This operation consists in incision of the anterior wall or substance of the abdomen, and is required in extra-uterine or abdominal pregnancy, in certain cases of tumours in the cavity of the pelvis, which impede delivery, and also in cases of rupture of the womb, or when the foetus is enclosed in a sac or cyst in the cavity of the abdomen.

The operation, as its name implies in a literal sense, consists in an incision of the stomach or belly, and is the first part of the Cæsarean section, or gastrohysterotomy, already described. The instruments, apparatus, and after-treatment, are the same in both operations.

Urinary Calculus.—Stone in the bladder, when large, may descend

before the infantine head during labour, and impede delivery, or expose the bladder to the necessity of incision, to rupture, or laceration. Guillemeau first described this disease as an impediment to parturition. In this case there was an abscess, which was followed by fistula, through which the urine passed involuntarily for a long time. (See *Vesico-vaginal fistula*, hereafter). Lagouache met with a case, in which he performed vaginal lithotomy, and extracted a stone, eight inches in circumference. Smellie relates a case, in which the head of the infant forced the bladder and stone externally. Professor P. Dubois, of Paris, describes a case, in which he discovered a solid tumour between the head and the pubis, which he displaced, and the labour terminated favourably. The practice in tumours of this kind, which are very rare, would be to push them above the head, or brim of the pelvis, in the absence of labour-pain, to lessen their bulk by lithotripsy, or the infant's head with the forceps, by craniotomy, or perform the operation of version or turning. If the calculus were detected during pregnancy, it ought to be extracted, as in the case recorded by M. Philippe, of Rheims, who removed a stone at the fourth month of pregnancy, which weighed nine ounces. Tumours of various kinds may be attached to the uterus, vagina, or vulva, and completely fill up these passages.

There are also many other diseases of these parts, which may impede delivery, and which will be described among the diseases of women. I shall therefore confine myself to a few observations in this place.

Cohesion, or Imperforation of the Vulvo-uterine Canal.—There may be cohesion of the external or internal labia, so as to close the external genital aperture, except at the superior part, at which there is an opening to admit the evacuation of the urine. The union may be so complete as to prevent fecundation or parturition. In either case incision becomes necessary, and unless it is made, the labour-pains may force down the presenting part of the infant so strongly as to lacerate the perineum. Hilden, Peu, Van Swieten, Ruysch, Barbout, Guillemeau, Nægele, Stedman, &c. relate such cases.

It may, however, happen that delivery may be accomplished without incision, as attested by A. Portal, Barbaut, and Bourgeois, Lauverjat, De la Motte, Harvey, &c.

The illustrious Harvey mentions a case in which the vagina was nearly closed after delivery, conception occurred, and parturition was completed without any operation.

In cases in which the little finger could not be introduced into the vagina, the same result was observed by Plenck, Puzos, Denman, Marbotin, Duparcque, &c.

Foderè relates a case nearly similar to the last. A girl of sixteen married, whose vagina could scarcely admit a goose-quill. She suffered great pain during each menstrual period, accompanied by distension of the womb, and the menses escaped at the superior part of the aperture. A young and vigorous husband employed his efforts in vain, and the medical advisers declared copulation impracticable. Nevertheless, after the lapse of eleven years, the woman became pregnant, though the vagina remained as small as before. It was feared that parturition could not take place; but, after the fifth month of pregnancy, the vagina

began to dilate; and, towards the end of the ninth month, allowed the passage of the infant.—*Mem. Acad. des Sc. Paris, 1712. Foderè, tom. i.*

I have also known a case, in which the vagina dilated in the last months of pregnancy.

A case occurred at the Obstetric Hospital at Turin, of a woman whose genital aperture was impervious. She appeared to be in labour; a tumour pressed on the perineum, and Professor Rossi was summoned to attend. He distinguished the head of the infant, cut over it, and parturition was speedily completed. He inquired how conception had been accomplished, and he was informed, that the husband, not finding what he desired, took the opposite route. On examination, there was found a congenital recto-vaginal fistula.—*Dict. des Sciences Medicales. Art. Impuissance.*

When recto-vaginal fistula is the result of disease, it is accompanied by inflammation or ulceration, and it is scarcely possible to suppose that coition would be accomplished. M. Marc attended a prostitute affected with recto-vaginal fistula, who continued her mode of life, and became the mother of two infants. He does not state whether the aperture was congenital or accidental.

Dr. A. T. Thomson attests a similar fact in his Lectures on Medical Jurisprudence, published in Dr. Ryan's *London Medical and Surgical Journal*, 1834 and 1835, vol. vi.

Another remarkable case of impotence is mentioned by Van Swieten, who quotes Benevoli. In this case the vagina was no larger than a goose-quill, in all its extent. The woman was married, and all the efforts of a vigorous husband were useless. The vagina was scirrhus. Fomentations were employed, and pessaries of different sizes successively introduced, and, after some time, the woman was rendered capable of cohabiting with her husband.

The celebrated Pucelle, Joan of Arc, was examined by two physicians, who found the vagina so contracted, that coition was impracticable. Dr. Thomson attended a lady, who also had consulted Sir Charles Clarke, for whom various means were employed to allay irritation, and effect dilatation in vain, and she would have applied for a divorce unless she had been allowed to retain her fortune, which was considerable. *Op. Cit.*

Such contractions may occur after tedious labours, or instrumental operations. I have met with four such examples.

When atresy or occlusion is complete after conception, a passage must be made for the infant, when labour comes on, or the perineum will be lacerated. In such case the incision should extend from the meatus urinarius to the anus, without any injury to the urethra or rectum. In one case, M. Kroon was obliged to divide the perineum, and M. Henckel has performed a similar operation.

The vulvar extremity of the vagina may be contracted by fleshy or fibro-cartilaginous bands, which may give way during labour, but should they not yield, they must be incised.

In one case, I proposed incision, which would not be permitted, and the bands were lacerated, but craniotomy became indispensable. In another case, that occurred in 1836, in which there was vesico-vaginal

fistula, the bladder became inverted, and the fundus descended through the fistulous opening near the neck, before the infant's head, while there was a strong fibro-ligamentous band across the vagina below, which offered great resistance to the advance of the head. The labour-pains were strong and incessant, and were not suspended by a full dose of the sedative solution of opium. I very much feared that the bladder would be torn away. I requested a consultation, and obtained the valuable advice and aid of Dr. Ashwell. Craniotomy was performed, the bladder returned to its natural position, and the band had given way. We observed, on previous examination, that the bladder was very red, and before the bulk of the head was reduced, it became livid; we were, however, inclined to a favourable prognosis. The woman had not a single bad symptom until the fourth day, when she found the fæces to pass through the vagina; and on examination I detected a recto-vaginal fistula. This result I anticipated, as I had cured her of both recto-vaginal and vesico-vaginal fistula a few years before, August, 1831, and by a plan which I believe was original, and which I claim as my own. (See Vesico-vaginal Fistula, hereafter). She recovered.

The vagina may open into the rectum, as attested by Barbaut, Dupuis, Gregoire, Devigne, Vermont, and lately by Marc; pregnancy occurred, and the infants were expelled through the anus, even without laceration of any aid. Dupuytren recorded a similar case a few years since.

Morgagni related a case, in which M. Gianella was called to deliver a woman, aged forty years, whose vagina opened above the pubis, and the aperture was dilated to admit the birth of the infant.

Inversion of the vagina may occur during pregnancy or parturition, and present a fungous livid mass, larger than the two fists. M. Velpeau met with such a case in 1828. Such a presentation has been mistaken for the placenta, and attempts made to remove it without success.

In twin or plural labours, there may be two placentæ placed side by side, and then they are not expelled until after the birth of the second infant, although I have known a period of three days to elapse between the expulsion of both infants. (See *plate 20*).

The reason is obvious, as each infant is enveloped in its own sac; so that after the rupture of this, and the expulsion of the twin, the placenta may not be detached by uterine action, there being another infant in the womb, and if the labour-pains cease after the birth of the first, its after-birth cannot possibly be expelled until after the birth of the second twin, triplet, quadruplet, or quintuplet, and then the womb is nearly empty, it will contract as in natural labour, and expel the placentæ.

In some cases, the two or more navel cords are inserted into one large or double placenta; and in these and as well as in all cases, each cord ought to be tied in the manner already described in the third stage of parturition, after the birth of the infant. (See p. 183).

The Placenta.—As a general rule, the obstetrician should not leave the patient until the placenta and membrane are expelled, as there is always more or less danger of hæmorrhage, while they remain in the womb, or the worst species of typhus and death may be induced.

When the placenta and membrane are not expelled at the expiration of an hour after the birth of the infant, it is necessary to remove them, unless they shall come away by the means recommended when describing the third stage of parturition. (See p. 183).

Some authors theorise on the feasibility of leaving the placenta in the womb after the birth of the infant; but the more correct and general opinion is, that it ought to be thrown off, removed, or extracted, previously to the departure of the obstetrician. Indeed, no mother, nurse, or parturient woman will be satisfied unless this is done, and very properly so. The expulsion of the placenta, and contraction of the womb, are as necessary as the birth of the infant, and must always be attended to by obstetricians. In most cases of natural labour, the placenta is separated in the course of fifteen or twenty minutes, and expelled into the vagina, from which it is easily removed, in the manner already described. (See p. 184, and *plate 18*). But when it is not in the vagina in twenty or thirty minutes after the birth of the infant, some say the practitioner may wait an hour, unless there is hæmorrhage. I have often waited an hour, and even longer, when there was no flooding, but never left a woman before the placenta was expelled by uterine action, or extracted by separation with the fingers from the womb. I have repeatedly observed the most fatal results from leaving the placenta in the womb, for three or more hours or days after the birth of the infant; and every obstetrician, who has had an ordinary share of practical experience, must have met with similar cases.

I am now alluding to those ordinary cases, in which the placenta is not expelled in the time just stated, as well as to those cases in which its circumference becomes adherent to the womb, perhaps, by inflammation (*Desormeaux*), some examples of which have fallen under my own observation. The medical obstetrician is guilty of a great dereliction of his duty, who leaves a woman, recently delivered of an infant, before the expulsion, removal, or extraction of the placenta.

Operation for Extraction of the Placenta.—The coat is to be removed, and the right hand and fore-arm lubricated with pomatum, lard, &c. The navel cord is to be twisted round two fingers of the left hand, and put on the stretch. (See *plate 18, fig. 1*; *plate 19, fig. 3*). The right hand, the tips of the fingers being brought in contact, is to be passed in the form of a cone, along the navel cord, through the external genital fissure, which is to be slowly and gently dilated, then into the vagina and uterus to the placenta, which, in general, will be found prominent in the centre, on account of being separated from the womb by more or less loss of blood. Some portion of the edge of the placenta is now to be separated with the tips of the fingers from the womb, pressure being made with the left hand on the abdomen, over the latter, so as to depress it, and the fingers slowly and gently insinuated between the substance of the placenta and womb, until the whole placenta is separated from the uterus. The hand is then to be closed upon it, the knuckles pressed against the womb, to excite its contraction, the pressure with the other hand, or that of an assistant, continued on the lower part of the abdomen, until the contraction of the womb will expel the hand, placenta,

and membrane, and obliterate the uterine cavity, as in natural labour. (See p. 183).

In some cases, the fore-arm must be passed as far as the elbow before the fingers can reach the placenta, although pressure may be made at the same time with the left hand on the abdomen and womb, either by the medical obstetrician or nurse; so that the operation is always frightful to the patient, the medical practitioner, and female attendant. Nevertheless, it is often indispensable.

The placenta is liable to a variety of diseases, as hydatids, ossification, &c., all of which may require its separation from the womb. The rule of practice is, to separate the whole, or as much of it as possible, great care being taken not to injure the womb, in any case. We must never forget the great obstetric axiom, *arte non vi*—by science, not by force or violence; do not injure the woman for the mere purpose of delivery; for if you do, and she die, to you shall be awarded the odium of having killed her.

When the whole or a part of the placenta is extracted, the external genital aperture should be gently compressed, and closed with the fingers, all clots of blood removed, a warm napkin applied, and some warm drink or cordial given to the patient.

Hour-glass Contraction of the Womb.—When the infant's body is expelled, in the absence of labour-pains, by the woman making pressure with the abdominal muscles and diaphragm, or when an ignorant obstetrician, either male or female, extracts the body after the expulsion of the head, in the absence of labour-pain, the womb will be left a large empty sac, and when the next pain returns, will contract irregularly, in the form of an hour-glass. (See *plate 18, fig. 1*). In this case, the placenta will be generally in the upper part of the womb, above the contraction, and will be retained. The danger of retained placenta is hæmorrhage, or if the placenta cannot be extracted, and remains two or more days, it decomposes, is partially absorbed, and produces typhoid symptoms and death.

Operation.—The hand is to be introduced in a conical form, as in retained placenta, and the fingers passed, one by one, through the contraction, (see *plate 18, fig. 3*), which may take two hours to accomplish, with more or less pain to the woman, and such great pressure on the hand as to cramp it and compel its withdrawal; and the muscles of the arm may become so painful as to remain sore for several days. The obstetrician ought to persevere as long as he can; and, in general, he succeeds in passing the hand through the contraction to the placenta, which he extracts in the manner mentioned in the treatment of retained placenta. (See *plate 19, fig. 3*). When the placenta is retained four or five days in warm weather, the genitals are contracted, decomposition of the retained organ takes place, and the woman generally dies.

It is sometimes retained without hour-glass contraction in delicate women, from irregular or inefficient action of the uterus, often caused by too full doses of the ergot; and in such cases a full dose of morphia or a sedative may be given, and afterwards a proper use of the ergota, immediately before the hand is introduced.

The placenta may also be detained from adhesion to the uterus, and then its complete or partial extraction, or so far as this can be effected, is indispensable.

The placenta may be expelled by uterine contraction, as in natural labour, but the womb may afterwards dilate, and give rise to profuse *after-hæmorrhage*, or *internal hæmorrhage*, which distends the organ. In such cases, pressure on the abdomen and the uterus, to contract the latter, the ergot of rye, dashing cold water on the naked abdomen from a ewer, or tea-kettle, and introducing the hand into the uterus, to press on and irritate its inner surface, so as to excite contraction, may be necessary. Pressure may also be made on the aorta.

This after-flooding may be expected in cases of delicate, or strong women who are timid, and may be prevented by a proper use of ergota during the labour. The dose may be increased in such cases, so as to put the womb completely under the influence of the medicine before the birth of the infant.

After-hæmorrhage is to be apprehended whenever the parturient woman is delicate, timid, or alarmed, as all are on primiparous, or first confinements; and the ergot of rye should be given in full doses in such cases before the birth of the infant. An illustrious and idolized princess, the hope and glory of this country, lost her life by the disease under notice, and for the want of a medicine, then unfortunately untried in this country, though well known for centuries elsewhere, as an efficient remedy for causing contraction of the gravid womb, the expulsion of the infant and its appendages, and the complete contraction of the uterus after delivery, the only natural and proper means for the prevention of after-hæmorrhage. (See *Labour complicated with Hæmorrhage*, hereafter).

Death of the Fœtus in Utero.—When the infant is dead for five or six weeks before delivery, its motion having ceased, the abdomen shrunk, a sense of weight, and rolling of a cold solid substance in it, when the woman assumes different postures; the breasts flaccid, no placental or foetal murmur, and labour threatened repeatedly, it appears to me that it ought not to be prevented by sedatives, because the absorption of the amniotic fluid and of the decomposed placenta, prove highly injurious to the health of the woman.

I have known the health greatly impaired for months after delivery, but some women do not seem to suffer from dead infants in the womb.

There is great difficulty in positively determining the death of the fœtus in utero, even by auscultation, and this has led to the precept of allowing the woman to arrive at the end of pregnancy, and to quiet premature uterine action before this period, by rest and opiates.

There are cases in which it is, perhaps, impossible to state that the fœtus is dead; but there are others in which little doubt can exist. (See p. 159).

Rupture of the Uterus.—This disease may happen at any period of pregnancy. It is ushered in with severe pain, vomiting, and tendency to syncope; the pain resembles labour, but more generally colic, and its duration is variable. The patient generally complains of “something having given way within her;” and blood may escape from the vagina, but in general, it passes into the cavity of the abdomen, causing

enteritis, or peritonitis. The motion of the infant is great during the rupture; and if the opening is large, the foetus passes through it, either totally or partially, into the abdomen, and can be felt through its parietes. The motion of the infant soon ceases, the tumour of the abdomen becomes diminished and irregular, milk is secreted, indicating the death of the foetus. The woman is generally destroyed by peritoneal inflammation, or loss of blood; but sometimes she goes to the full time, when pains, like those of labour, are experienced; they frequently go off, and the infant may be retained for many years, being inclosed in a cyst, as was observed by Dr. Percival, who described a case in which the foetus was retained for twenty-two years, and then its bones expelled by the rectum; it has also been discharged by the vagina and abdominal parietes, numerous instances of which are on record. Lieutard mentions cases in which the foetus was retained from ten to forty years; and Dr. Burns relates many other similar examples. Women seldom recover after rupture of the uterus; they most commonly sink from inflammation of the bowels, or from inflammation or suppuration of the uterus, parietes of the abdomen, rectum, vagina, or perineum, through some of which parts the foetus escapes piecemeal. (*Med. Comment.*, 7, vol. iv.; *Med. Journ.*, 8, &c. &c.). Dr. M'Keever, of the Dublin Lying-in-Hospital, published an interesting work, in 1824, on Lacerations of the Womb and Vagina, well worthy the attention of medical practitioners. He described several cases, in many of which the patients recovered. He mentions one case, in which rupture took place during two successive labours, and the woman did well. This disease generally occurs in transverse or arm presentations, or in preternatural labours, in which there is some impediment to delivery.

When it happens in the early months of utero-gestation, the ovum may escape through the laceration into the abdomen, even survive there, and increase in size. When the foetus escapes into the abdomen, its motions are often felt stronger than before. If the mother survives, the womb decreases, and returns to its former unimpregnated size; the menses will return, the woman may again become pregnant, and she may even bear children, before the expulsion of the retained extra-uterine foetus.—*Journ de Med. Trans.*, vol. v., p. 422; *Burns*, p. 105.

Cases of ruptured uterus, in the early months of pregnancy, from falls and blows, are recorded in *Phil. Trans.*, vol. xlv., p. 121; *Mem. Acad. Scien.*, 1709; *Journ. Med.*, 1780; *Burns' Mid.*; *Annals of Med.*, 412; *Journ. Med.*, vols. v. and vi.; *Med. Coms.*, vol. ii.; *Dublin Med. Trans.*, 1830, vol. i. New Series.

When the disease is about to end fatally, the pulse becomes frequent and small, the abdomen painful, the strength declines, and sometimes vomiting ushers in dissolution.

The most common causes of rupture of the uterus are mental emotion (Percival and Underwood, *Med. Coms.*, vol. ii. p. 77), exertion, or violence. It may happen with a noise, and be audible to the bystanders. The great danger of allowing a woman to continue in active labour for more than twenty-four hours, is rupture of the uterus. If we find, on examination, that the os uteri is dilated, the labour has really commenced; and if the process continues, and is not over in twenty-four

hours, there is invariably some difficulty; but some women have severe, and even continued pains, for one, two, or three days, without being in labour. Pressure on the womb, by the infant's head, may render a part of the organ thin, and liable to rupture. Spasmodic action, or attempts to return a limb of the infant, when presenting, external violence, use of the forceps, and the operation of turning, are often causes of this laceration.

Three modes of *treatment* have been recommended in rupture of the uterus: to deliver by turning, or the forceps, to perform gastrotomy, or to leave the case to nature. Dr. Burns loudly condemns the idea of forcibly dilating the os uteri. "I question," says he, "if the woman could live until the delivery were accomplished." This is the general opinion, though I believe it liable to exception, when gestation has exceeded the seventh month. It must be admitted, that parturient action may take place at any period of pregnancy, therefore, the cautious dilatation of the uterine orifice, in a case of rupture, or of convulsions, would be infinitely less dangerous than cutting through the abdomen, and much more accordant with science than allowing the mother and infant to perish without any aid. I was impressed with the force of this opinion in a case of convulsions in the eighth month, which defied copious depletion, large doses of camphor, and proved fatal; for, acting on the rule which inculcates the danger of dilating the os uteri, nothing remained but the Cæsarean operation, which would not be sanctioned. Now, in such fatal cases, and they are occasionally met with, the puncturing of the membrane, or the gradual dilatation of the uterus, can scarcely be objected to, when, without it, the fate of the woman and infant is inevitable. Admitting the possibility of laceration, which need not happen in ordinary hands, this, after all, is not so formidable as is generally imagined. We have numerous cases of extensive rupture of the womb recorded by M'Keever and Collins, of Dublin, which terminated favourably, and we should bear in mind the fact of the dilatability of the womb at any period of pregnancy. Experience will determine whether this proposal is not more feasible and less dangerous than gastrohysterotomy, or gastrotomy, in the cases under consideration. Such was my opinion in 1831.—See *Manual of Midwifery*, third edition.

In 1834 I had an opportunity of discussing this point with Mr. Barlow, of Blackburne, the first successful male obstetrician who performed the Cæsarean operation in this country. He assured me that in cases of convulsions during labour, and in placental presentations, he was accustomed for several years to dilate the uterine orifice, slowly and carefully, and invariably succeeded in effecting delivery, without ever lacerating any part of the circumference of the os uteri.

Emboldened by the experience of so eminent an obstetrician, I have since succeeded in dilating the uterine orifice in placental presentations, extracted the infant and placenta, excited uterine contraction, which arrested profuse hæmorrhage, which otherwise would have destroyed the woman. I can perceive no valid objection to this practice in the cases under consideration.

The operation of gastrotomy, I apprehend, can only be resorted to with a view of saving the life of the foetus, in one species of extra-uterine

foetation, viz., in the abdominal or ventral, and after the seventh month of gestation, when the viability of the infant is certain. In tubal and ovarian pregnancies, the foetus generally dies about the second or third month, and the mother may likewise perish in consequence of hæmorrhage from the ruptured sac, or from inflammation. All obstetric writers agree that it is impossible to distinguish which form of extra-uterine foetation exists at this early period. Moreover, the woman may recover, in the majority of instances, without any operation. This is generally the case in abdominal foetation.

After the death of the foetus, in such cases, the amniotic fluid is absorbed, the infant becomes indurated, petrified, or transformed into a substance like adipocere, the cyst fibrous, cartilaginous, or osseous, and all form a solid tumour, which may remain to an indefinite period, perhaps half a century, in the abdomen, without serious injury to the woman; but this is rarely the result. The sac may be filled with pus, the foetus become putrid, the cyst adhere to the vicinal parts, and an opening form in different portions of the intestines, perineum, vaginal, or abdominal parietes, through which the bones of the foetus may be discharged. This process is tedious, and sometimes fatal to the mother; but the records of medicine afford the most ample testimony of the favourable termination of the greater proportion of such cases.

Extra-uterine foetation is of very rare occurrence, and its protraction to the ninth month has been seldom observed. Instances are recorded, however, of its arrival at the full period, by Haller, Baudelocque, Leroux, and Galli. We can readily understand the reason of abdominal foetation being more protracted than tubal, ovarian, or utero-interstitial (Desormeaux), when we recollect the extent of the abdominal cavity, the mobility of the viscera, and the greater amplitude there is for the development of the foetus than in the former cases.

The diagnosis of extra-uterine foetations is extremely difficult. Many cases of this description have been supposed to exist, in which natural parturition finally took place. M. Capuron states, that about thirty-five years ago, some of the most eminent obstetricians of Paris made this mistake at *La Charité*, and on another occasion, extra-uterine foetation was only discovered after death. Retroversion of the womb may also be mistaken for it. These facts should be duly considered before recourse can be had to gastrotomy.

After the most minute consideration of all the circumstances of ventral foetation, MM. Capuron, Desormeaux, Gardien, Velpeau, and various other French and continental writers, are advocates for gastrotomy, after the seventh month. They argue that the woman must be lost either by hæmorrhage, from the bursting of the foetal sac, or by inflammation, and that the infant will also be sacrificed in most cases. They maintain that the operation is as safe as hysterotomy, and Capuron asserts that it has been crowned with success, although he has not recorded any particular instance in which the operation has been performed. If he means that gastrotomy and hysterotomy are equally safe, I must differ from him. (See p. 271). The circumstances of cases which require these operations are widely different. In ventral foetation, the presence of the ovum generally irritates the peritoneum, a mem-

brane is formed, and envelopes the foetus, and also becomes attached to the different viscera, epiploon, mysentery, vertebral column, external surface of the uterus, and other parts. Its inner surface is smooth, and highly vascular near the placenta, and its colour may be red, brown, or black. The placenta is broader and thinner than in ordinary pregnancy, and its vessels are comparatively fine, (Turnbull and Desormeaux), and therefore incapable of affording the proper supply of blood, in most cases after the third or fourth month, and hence the death of the foetus. Now these circumstances are totally different from the natural condition of the uterine appendages, in cases that require the Cæsarean operation, or gastrohysterotomy. They present strong objections to the latter operation. M. Capuron is also of opinion, "that the abdomen should be laid open, in the direction of the linea alba, or according to the position of the infant, and the placenta detached, as there is no danger of hæmorrhage, or it might be left behind, and allowed to separate and present itself at the abdominal opening." He agrees with M. Gardien, that the operation should be performed several days before the period at which uterine action occurs, as the mother and infant would have a better chance, for when the membrane ruptures, both must be lost by hæmorrhage. Few obstetricians, I apprehend, would venture to follow this advice, and perform gastrotomy several days before uterine action or abdominal pain occurs; and most are so convinced of the danger of the operation, that they allow hours, days, weeks, and even months to elapse after the supposed uterine or abdominal pain before they venture to have recourse to gastrotomy. M. Velpeau is of opinion, that immediately after the rupture of the sac, the operation should be performed—"with the operation death is too probable, without it death is nearly certain." It appears to me that these writers speak too confidently on the propriety of an operation which, I believe, has never been successfully performed. They ought to have stated, whether the sac which surrounded the foetus is to be extracted or left behind, and also what is to arrest hæmorrhage after the detachment of the placenta. If the sac and placenta are left behind after gastrotomy, they will, most probably, induce irritation and inflammation, and how can the former be separated from its adhesions? M. Colomb performed gastrotomy in a case of extra-uterine foetation, but it terminated fatally. (*Recueil des Actes de la Société de Lyons*).—He regretted, as also did Baudelocque and Guerin, that they had not made an incision through the vagina, as the head was clearly felt pressing upon that part. Sabatier mentions that Lauverjat extracted the infant by an incision through the vagina, and the woman recovered. (*De la Med.*, tome i., p. 136).—Now this operation is evidently preferable to gastrotomy, because much less important parts will be divided, less hæmorrhage, less inflammation, and less suppuration will be induced. Besides, the action of the abdominal muscles and diaphragm may expel the infant; and if expulsion be not effected in this way, the feet of the infant can be brought down, and turning performed.

The placenta should be left attached, in extra-uterine pregnancy, lest fatal hæmorrhage ensue, and the operation should be performed even if the infant was dead, but had arrived at the completion of the ordinary

period of pregnancy, to save the woman from peritonitis, when threatened. The wound should be left open, to allow the discharge of liquor amnii, blood, membrane, placenta, or purulent matter; of course the after-treatment ought to be strictly antiphlogistic. (See p. 276).

If the infant's head can be felt, in these unfortunate cases, through the vagina, which is extremely probable, from the superincumbent weight of the foetus during the latter months of utero-gestation, it must be admitted, from the preceding observations, that extraction through the vagina is much safer than gastrotomy. Happily, however, these cases are of extremely rare occurrence; but when they do present themselves, as in the example which gave rise to these remarks, they become subjects of grave consideration.

Labour with Retroversion of the Uterus.—Dr. W. Hunter first described this disease in 1754. It happens in the third, fourth, or fifth month of pregnancy, by a distended bladder pressing upon the enlarged uterus, and forcing its fundus downwards and backwards, between the vagina and rectum. This mal-position of the organ prevents the discharge of urine and fæces, and consequently may destroy the patient. Severe bearing-down pains are felt, but especially when the bladder becomes distended. The complaint may be confounded with enlarged ovary, or extra-uterine conception; but this is of little consequence, as the indications of treatment are similar in these instances, namely, to draw off the urine, and procure alvine evacuations. The greater danger is, that the bladder becomes distended, may be inflamed, become gangrenous and perforated, or may adhere to the abdominal parietes. Inflammation and gangrene of the vagina may also be produced. Suppuration may happen, and purulent matter be discharged with the urine.

Treatment.—The grand object is to evacuate the bladder; and in order to succeed in effecting this by the catheter, the position of the urethra is to be borne in mind, which is curved towards the sacrum. Hence the concavity of the catheter should be turned towards the sacrum, and then the operator generally succeeds. In some cases, the finger is to be passed into the vagina, so as to press down the os uteri, and facilitate the introduction of the instrument, and an elastic catheter only will sometimes succeed. The obstetrician seldom fails in drawing off the urine; but if it should so happen that he cannot succeed, puncturing the bladder is advised (Sabatier); an operation very seldom, if indeed, ever necessary, (Burns). Moderate pressure is to be made on the bladder while the urine is coming off, as otherwise a considerable quantity of it might remain behind. The water is to be drawn off, morning and evening, and by this plan alone the womb will regain its natural situation. After the first use of the catheter, a purgative or cathartic enema is to be given, and an anodyne clyster, if there be much bearing-down pain. If any signs of inflammation appear, the usual antiphlogistic remedies are to be employed. Burns strongly contends, that in most cases, the proper evacuation of the bladder will cure the retroversion; but should it fail, which is most unlikely, an attempt should be made to replace the uterus. This is done by passing two fingers into the rectum, and two or more into the vagina, and pressing

up the uterine tumour, (Sabatier, Blundell).—After the reduction of the womb to its proper position, the patient should lie on either side, and not on the back, (Capuron). Hamilton recommends this practice in every instance, although Denman thought the morbid position should be left to nature, and Burns seemed to be of the same opinion, (1829).

In these cases, the os uteri is turned upwards, and presses on the neck of the bladder, so as to prevent the introduction of the catheter. When the catheter cannot be employed, Drs. Hunter, Jourel, and Hamilton, recommend puncturing the membrane, to cause miscarriage: they very properly deem retroversion a most dangerous disease. Meriman said it might happen at the full time; but this appears impossible, the uterus being so much higher than the bladder. Duges says it cannot occur after the fourth month. Dr. Hunter observed that the bladder has been so much thickened, that some bystanders thought it was the womb itself. If labour happens during retroversion, it will be slow and tedious; but is very rare, and scarcely ever occurs under such circumstances, but may require vaginal hysterotomy. (See p. 280). The complaint is said to arise from agitation and violent exertion, or coughing, but this opinion is doubtful. Dr. Dewees seems to deny it.

Antiversion of the womb is said to exist when the fundus is thrown forwards, between the vagina and bladder; the orifice of the womb being turned to the sacrum—a rare occurrence. Dr. Burns never saw an instance of this kind; and, in such a case, the urine is to be drawn off, and the fundus uteri raised up in its proper position. The bladder is sometimes thrown forward by pregnancy, distorted pelvis, and pendulous belly; so that, in passing the catheter, as soon as we clear the pubes, the handle of the instrument is to be depressed; whereas in retroversion, inversion, or prolapsion, it is to be elevated, as the bladder, in all these cases, is thrown backwards into the cavity of the pelvis. It is very important that these observations should be borne in mind, for the operator will otherwise be foiled in attempting to pass the instrument.

Another derangement of the impregnated uterus occurs, which is named *obliquity* by authors. The obliquities are, first, the lateral obliquity; second, the anterior obliquity, or antiversion; third, the left lateral obliquity; and fourth, the posterior obliquity, or retroversion. Two of these conditions I have just described. The right lateral obliquity is caused by the distension of the rectum, which presses the uterus to the right side. The distension of the sigmoid flexure of the colon, and promontory of the sacrum, assist in effecting this mal-position; hence it is the most frequent by one hundred to one, according to Baudelocque. In fact, the os uteri will not be always in a line with the fundus; and hence the severity of labour under such circumstances, a frequent occurrence.

The anterior obliquity happens rarely in first pregnancies, owing to the firmness of the abdominal parietes; but it often occurs to the same woman, in future cases. In the latter months, anterior obliquity becomes very inconvenient, by pressing forwards, and causing the woman to evacuate the urine and fæces. It has been so urgent, as to oblige the patient to remain in bed. It is most common in cases of small short women. (Dewees).

The best and only remedy for this distressing state, is a pair of drawers and a half waistcoat, which are to be put on in bed; the patient being in the recumbent or lying posture. She is to raise up the womb, by locking her hands together over the lower part of the abdomen, and then slip on her dress; while an attendant is to lace the waistcoat tightly, so as to keep up the uterus. This is to be done before the patient assumes the erect posture, otherwise it could not be effected but with much difficulty. The womb will be prevented from falling forward by this contrivance, and the waistcoat need not extend higher than the navel, and may be supported by suspenders or braces, if necessary; and thus will anterior obliquity, or antiversion, be greatly prevented, and the woman be rendered comparatively comfortable and relieved. The same treatment will also relieve lateral obliquity; but before applying this article of dress, the woman is to lay on the opposite side. These obliquities are also to be relieved by manual operations, during labour; while the proper relations between the axis of the uterus and pelvis are to be maintained.

If the os uteri is not brought to the proper axis in the pelvis during labour, much suffering must be endured, and great risk incurred, by permitting the head to descend, covered by the uterus. The hand, after being lubricated with lard, pomatum, olive oil, or fresh butter, must, in some cases, be passed into the vagina, in order to discover the orifice of the uterus; a finger is then to be introduced into the orifice, if dilated, or easily dilatable, so as to hook it down into the vagina, in the proper direction, and is to be kept there until the regular pains force the uterus to correspond with the axis of the pelvis. By pursuing this plan, the patient will be saved from much suffering. This malposition was mistaken for occlusion of the os uteri, and an incision was made to allow the exit of the infant (see p. 280), although the same woman had borne children afterwards by the natural passage. The French writers describe inclination of the womb, that is, in which there is a tendency to its displacement.

Nauche describes different degrees of retroversion and antiversion, under the denominations retroflexion and antiflexion; elevation and descent, inclination or lateral obliquity, hernia, renversement, when the internal surface descends through the vagina, all of which may occur in vacuity of the organ, during pregnancy, at the moment of delivery, or after delivery.

The British obstetricians have noticed obliquity of the womb, in describing the disease under the name of "pendulous belly." It may happen that the abdominal muscles do not readily yield in first pregnancies; at other times they do so, allowing the uterus to fall forwards, and cause the disease under notice.

The drawers and waistcoat are the best contrivances for this state, as already mentioned. When the parietes of the abdomen do not yield freely, the patient complains of pain and tension; and the irritation may be so great as to cause miscarriage.

This state will be relieved by blood-letting, and warm fomentations of poppies, sedative plaisters, &c. One part sometimes yields more than another, even one portion of a muscle, and causes deformity; but it is

attended with little inconvenience. The late Professor Hamilton placed a woman with pendulous abdomen on her back, during labour, or for a few pains, so that the position would be rectified, as the weight of the infant would fall on the spine and back of the pelvis, and the head would be forced into the natural outlet. I have often advised this position with advantage.

Hydrometra—Hydorrhœa—False or Spurious Waters.—From the third to the ninth month of utero-gestation, there may be a watery discharge from the vagina, which may occur in gushes, or escape slowly, and be continued for six months, without impeding the development of the gravid uterus, or without inducing abortion or miscarriage. This disease has been described under the denominations at the commencement of these remarks. It was first noticed by Mauriceau, and denied by Baudelocque. In some cases there is a sudden gush of fluid, and afterwards a continued draining, or the quantity may amount to several pints. The discharge may or may not be preceded or followed by uterine contractions, or by dilatation of the os uteri, the pregnancy going to the full time, and the membrane distended as in natural labour. The quantity of the fluid varies exceedingly, for sometimes an incredible amount is effused. The discharge may occur once or oftener, and at different intervals, sometimes continuing for a long time, increased by mental or corporal excitement or depression, the cause being sometimes undiscoverable, and the discharge is greater, in some cases, at night, in others during the day. The fluid is generally yellowish, sanguinolent, or perfectly limpid, or filled with flakes of fibrin.

A great diversity of opinion exists as to the source of this fluid. Some think it is produced by the amnios, others that it is contained between the amnios and chorion, more, that it is caused by a rupture of lymphatics or hydatids, situated between the chorion and uterus; but by far the greatest number maintain that it is situated between the chorion and uterus. It may also proceed from a certain point of the mucous membrane of the womb, from which the decidua or chorion may be detached.

The first opinion cannot be correct; because all admit that rupture of the amnios is invariably followed, in a few hours or days, by expulsion of the embryo or foetus. The next opinion is also untenable, as no fluid is found between the chorion and amnios after the third month; nor is it easy to understand by what cause there could be rupture of the lymphatics; and even admitting this, for the sake of argument, it would not account for the large quantity of fluid which is often effused. The existence of hydatids must be admitted; but even these could seldom produce the quantity of discharge.

The following cases, I think, clearly prove the received pathology: Puzos describes four examples which occurred in the last two months of gestation, in which the fluid was situated between the membrane and uterus; the pregnancies were completed, the membranous sac in each case was perfect, when labour commenced, and the parturition was natural. Hilden relates a case which occurred at the fifth month of pregnancy, attended by labour pains, and followed by a discharge of ten pints of fluid; the pregnancy went on without any other accident. Mercier describes a case at the same period; the patient was attacked

with fever, accompanied by pains in the pubic and lumbar regions, ardor urinæ, constipation, and a slight discharge from the uterus. On the sixth day, a dead and a living infant were expelled; and between the births an elongated bladder presented in the vagina, from which ten pints of a lactescent fluid, in which flocculi of albumen floated, were discharged. A membranous sac followed. It is to be remembered that twins have separate membranes and placentæ, (see *plate 20*); that one membranous sac may burst, and its fluid be effused days, weeks, or months, before the second infant is born, as in those cases in which weeks or months elapse between the respective deliveries. But this will not account for the continued discharge of fluid several months before delivery. Burns has met with many cases, and does not consider the fluid amniotic. Pentland, of Dublin, also noticed the disease, (*Dublin Med. Essays*, Nos. I. and II.); and I have met with a case at the third month, and the pregnancy was uninterrupted. Mr. Burton Brown, of Blackfriars Road, related four cases at the London Medical Society, in 1831, in two of which labour did not happen for a period of 132 days—in none was it accelerated. Various other examples might be quoted; but enough has been said in support of the opinion, that the discharge is not amniotic. Should the reader wish for further evidence, he may consult the *London Med. and Surg. Journ.*, 1830, vol. iv., edited by the author, in which there is an account of the disease, translated from an essay by Dr. Geil, of Heidelberg; and he will also find much information in the *Dict. Abrégé des Sc. Med.*, Art. *Hydrometre*.

Redundancy of the Fluid of the Amnios—Distention of the Abdomen.—The amniotic fluid may be so much increased, that a woman, at the seventh month of pregnancy, appears as large as at the full time. The disease is a dropsy of the ovum, *hydramnios*, and the health seldom suffers. The foetus is expelled, in general, about the eighth month; and the labour is often attended with hæmorrhage. The motion of the foetus is obscurely felt in the fluid, and it is usually in the upper part of the womb; while the water, to the amount of some pints, is generally towards the orifice. This disease has been called a monstrous conception. It may be caused by the venereal taint, general or uterine debility, or original disease, or imperfection of the ovum in the ovary. The infant, if born alive, is weak and delicate, and seldom lives—it generally dies in the womb; and its death is marked by a shivering fit, cessation of its motion, and flaccid breasts. This sort of pregnancy frequently occurs to the same woman.

Treatment.—Tonics, cold bath, laxatives, blood-letting, and mercury, are the remedies to be employed, which may or may not be effectual. A course of mercury before conception is the only remedy, when a venereal taint is suspected; and it must be used by both parents. (*Trans. Dub. Coll. of Phys.*, 1824, vol. iv.) This was also the opinion of Drs. Joseph Clarke and Hamilton.—I have met with some cases of this disease: one woman miscarried at the seventh month, had a copious discharge of amniotic fluid, and a putrid infant: she had lost six children in the same manner, and three at the eighth month. According to Dr. Beatty, of Dublin, both parents must have a full course of mercury; and unless a large quantity be taken, a cure will not be effected. His

paper, in the Transactions of the Dublin College of Physicians, vol. iv., is well worthy of serious perusal. He informs us, that the Dublin physicians held this opinion since 1792. Dr. Hamilton inculcated it in 1819 and 1820. After taking a proper quantity of mercury, healthful infants will in future be produced. In one of my cases, a large quantity of sarsaparilla had been tried, after mercury, without success; the lady became pregnant, and her last infant was born dead. She is a delicate woman, and is subject to herpes on the mons veneris. It was determined that both husband and wife should be put under the influence of mercury for six weeks after the delivery of the latter, during which period they were to live separately. This plan was tried, pregnancy recurred, and the woman is now the happy mother of six children. I have subsequently treated several cases of the same description with success; and I am convinced that there is no use in giving mercury when the woman has conceived, for in such cases the infant will be born dead, and partially decomposed, between the seventh and eighth month. The disease is communicated at the time of conception, and cannot be cured during pregnancy. There are different degrees of venereal contamination; some infants are born alive with eruptions, and others are feeble without eruption, which may appear a few days or weeks after birth. In the latter cases, the exhibition of mercury, iodate of potass, and sarsaparilla, to the mother, generally effects a rapid cure; and hydrarg. c. creta, may be given in small doses to the infant. Such cases are of very common occurrence in hospital and dispensary practice in large towns and cities, and are well known to observant medical practitioners. I have fully described them in my *Lectures on Diseases of Children*, London Med. and Surg. Journ., 1833.

When the liquor amnii is copious, and the uterus largely distended, the os uteri was forced open by the older practitioners, in order to evacuate the fluid; a very improper operation. The os uteri sometimes dilates; and, in such cases, Puzos and others recommended the laceration of the membrane; but although this causes expulsion of the fluid and infant, it cannot cure the disease.

Anasarcous and œdematous swellings of the lower extremities are caused by pressure of the enlarged womb on the lymphatics; aperients and frictions are the best remedies. These swellings, however alarming to the patient before or during labour, rapidly disappear after that process, the pressure of the gravid uterus, which caused or increased them, being removed, and are to be treated as in ordinary cases.

Ascites, or dropsy of the abdomen, may also occur during pregnancy and labour. It has often been mistaken for pregnancy, and *vice versa*. Tapping has been employed with success, although condemned by Denman. Dropsy may exist, and conception also occur; the abdomen will be greatly distended in such cases. Burns recommends tapping in the early months, and asserts it is more successful than towards the end of pregnancy. Great care must be taken lest the uterus should be punctured, an occurrence which has often happened. If dropsy depends on the enlarged liver, the distension of the abdomen and pressure of the infant, after the seventh month, increase the irritation, and death may happen. Mild purgatives and diuretics, as the compound powder of

jalap, or the electuary of sulphur and supertartrate of potass, are used with advantage until after delivery.

I have known pregnancy mistaken for dropsy, tapping performed, and the infant born during the operation. In another case, the woman was ordered to undergo the same operation on the following day, but she left the hospital in the evening, and gave birth to an infant on the next day. (See *Signs and Detection of Pregnancy*, p. 150).

Varicose Veins.—The legs, thighs, genitals, and abdomen, may be attacked with a varicose state of the veins, or œdema, during pregnancy and parturition. This condition is also induced by pressure of the uterus on the large veins in the pelvis, and thus interrupting the circulation. These varicose tumours, although painful, are not dangerous; the recumbent posture and tight pressure generally give relief; but tight bandaging is injurious, and must only be resorted to after delivery.

Syphilis may be communicated to pregnant women. Denman recommended the use of mercury, so as to impede the progress of the disease, but not cure it completely. He was of opinion, with other eminent physicians, that mercury, if used freely, would destroy the infant. He recommended the further use of the remedy after delivery. He asserted that he never saw an infant born with true signs of venereal. Hamilton inculcates the contrary, and maintains that he has often seen the infant covered with the copper-coloured venereal eruption. This is the received opinion. There can be no doubt of the fact.

Mr. Abernethy asserts, that the infectious diseases of the mother are communicated to the infant, after a certain period. He maintains, that if the mother have the measles, small-pox, or hooping-cough, the infant is liable to participate in such diseases, and premature labour coming on, infants have been covered with small-pox; but this does not happen till, perhaps, the seventh or eighth month. He knew an instance of a mother who had the hooping-cough, who was delivered of an infant with the same disease, at the time it first breathed. He thinks these diseases are not communicated before the sixth month. (Lectures in *Lancet*, 1827, vol. xi.)—This is an erroneous idea, the embryo is infected at its formation. I have known a case, in which the lady was salivated during three pregnancies, and before the sixth month, and on the last occasion six months after conception; but she produced a putrid infant at the eighth month. I advised her and her husband to undergo a course of mercury after her delivery, during which they were to live separately. They did so, a cure was effected; and she has now living infants.

If *gonorrhœa* occur during pregnancy, it is to be cured as soon as possible, otherwise miscarriage might be induced from the irritation it produces. I have known every sign of miscarriage most urgent, in consequence of this disease. It is a difficult matter to cure it during pregnancy, and the infant is generally born with purulent ophthalmia, which often causes loss of vision in one or both eyes.

Umbilical and Ventral Hernia may require attention during pregnancy and parturition. They are to be relieved by a proper bandage or truss in the first case, and by pressure with the hand in the second. The same practice should be pursued in first pregnancies, when the abdominal muscles are partially and unequally distended.

Inodorous or fœtid gas may escape from the womb in the unimpregnated and pregnant states, as well as during parturition. This disease is called *physometra*, or *uterine tympanites*, and is removed by improvement of the general health.

Moles, hydatids, polypous and other tumours may exist in the womb during pregnancy and labour. (*Vide ante*, p. 281).

Laceration of the Labium externum, or sanguineous infiltration of this part, may require the tampon or plug to arrest the hæmorrhage, or an incision to evacuate the effused blood.

Laceration of the Perineum is a frequent occurrence in mismanaged labours. (See supporting the perineum in the second stage of labour). This part may be partially or completely torn by the head of the infant, or the improper use of instruments; or it may happen in despite of the most judicious management.

The laceration may occur in the inferior part near the anus, in the middle or at the superior commissure. Sometimes there are two perpendicular openings, and they commence from below upwards. In first labours, more especially when the woman is very young, or advanced in life, there is often a slight laceration at the superior margin, on its inner surface, and this cannot be possibly prevented in many such cases.

Treatment.—The limbs ought to be kept in apposition by means of a roller applied round them, simple dressing applied, and union by the first intention effected. A piece of oiled lint, or the corner of a napkin dipped in cold water, ought to be applied to the inferior commissure of the labia when the urine is being evacuated.

When suppuration occurs, it may be necessary to insert one or more sutures, to bring the separated edges in apposition.

Labour with Protrusion of the Bladder.—The bladder may be protruded before the head of the infant during labour, and sometimes appear external to the genital aperture. It should be replaced in the absence of labour-pains, and kept in its situation with the fingers until the pain pushes the head along and below it. I once attended a woman whose bladder remained protruded until the head was perforated and reduced, and it was subjected to such great pressure, that it became livid, but the patient finally did well. Dr. Ashwell also saw this case with me. (*Vide ante*, pp. 285, 286).

Hernia may encroach on the vagina, and protrude before the head during labour. It ought to be reduced when the pain ceases, and kept so until the head or breech, as the case may be, has descended over it.

Sloughing of the Bladder or Rectum may be induced by undue pressure during labour, caused by the infant or by instruments, and produce vesico-vaginal and recto-vaginal fistula. These occur a few days after labour. The urine and fæces escape into the vagina, and cause inflammation, suppuration, and ulceration. I was the first British obstetrician who succeeded in curing both fistulæ in the same person, without sutures or actual cautery. A full account of this case will be found in my work on Midwifery, 1831, p. 513. M. Velpeau has also succeeded by my method. (*Traité Complet de l'Art des Accouchemens*, 1835, p. 524).

I had been consulted by several unfortunate sufferers from vesico-vaginal fistulæ, who had applied to the most eminent of the faculty without relief. Indeed, the disease was considered, a few years since, incurable. In one case, some eminent obstetricians certified, that the opening would admit the extremities of the four fingers, and that the case was hopeless. Some years afterwards, I found that the fistula would only admit the point of the index finger. After much reflection, I arrived at the conclusion, that the want of success arose from overlooking one of the first principles of the healing art, viz., remove the cause, and effect will cease. The cause in the disease under notice was the irritation produced by the constant application of so acrid a fluid as urine to the vagina, which must be followed by inflammation, suppuration, ulceration, &c. It is to be recollected that sloughing of the bladder, induced by tedious labour, occurs on some part of its inferior surface, and that the urine must continually escape while the patient is in the erect or sitting posture, or lying on the back. It therefore occurred to me, that were the person to lie on either side, or on the anterior surface of the body, the urine would be collected on the sound parts of the bladder, and no longer pass through the fistula into the vagina, and the cause of irritation would be removed. Another advantage is, that the edges of the fistula would gradually contract and close.

The next indication is to plug the vagina with oiled lint, so as to prevent any urine, that may escape into that passage, from causing but as little irritation as possible. The lint should be removed, and a new quantity applied daily, more especially in warm weather, when the plug, from being saturated more or less with the urine which may fall upon it, may become offensive and a cause of much irritation. The bladder should be evacuated with a catheter, unless the urine passes through the urethra, which will be the case, if the woman lie on the sides or anterior aspect of the body, as above advised.

When the bladder is kept nearly empty, a catheter being worn and properly secured with tapes, so as not to escape into the organ, as I was once called upon to remove, its sides will approximate, the aperture will contract and finally close.

But in some cases, the edges of the opening will cicatrize, when of long standing, and require to be touched with nitrate of silver, to keep them in a state of granulation.

It was on this principle that the late celebrated Baron Dupuytren applied to the actual cautery, and also as burns contract. This practice has not been generally followed, as it is very painful, and often unsuccessful. It must be obvious that the constant application of so saline and acrid a fluid as urine to a burn, must produce great suffering and constitutional injury. Nevertheless, the actual cautery was applied, in one unsuccessful case, as often as sixty times, by Mr. Baxter. (See *Lancet*, Dec., 1836). He was so unfair as to claim my originality, as to change of position, which I proposed and practiced successfully in May, 1831, (see *Manual of Midwifery*, third edition, pp. 513—515); and though informed of this by a gentleman at Leeds, who quoted my work, the honest reply was—that he, Mr. B., could not find any account in the first edition, in 1828, three years before I adopted the plan, and

eight before it occurred to himself, I having proposed it five years previously to his letter in the above named periodical.

I leave the reader to form his own opinion upon this conduct, which, at the time as well as now, I considered unjust, unwise, and unprofessional; nor should I notice it here, had I not been writing of the disease under consideration.

Before I insert my first successful case, I deem it right to offer a few other observations, as to the former treatment. This consisted in the use of pessaries, sponges, elastic bottles, bladders inflated in the vagina, sutures, caustic, and the actual cautery. To the year 1831 these remedies generally failed, because the position of the woman was not properly attended to. Previously to that date, I mentioned the importance of position to Professor Samuel Cooper, in a case, about which he consulted me, that had been declared incurable, according to the patient's statement, by Sir Charles Bell and Mr. Mayo, then surgeons to the Middlesex Hospital.

The following was the history of my own case:—

The sufferer was twenty-one years of age, of low stature, general health always good, was delivered of her first child after a labour of three days' duration. The medical attendant said there was no malformation. On examination, it was discovered that she had recto-vaginal and vesico-vaginal fistulæ. She was visited by Dr. Conquest, who was of opinion an operation was indispensable; and he recommended the patient to Mr. Earle. She, however, applied to Sir B. Brodie for the purpose of performing the operation; but that gentleman declined to operate, and advised her to place herself under the care of Mr. Earle, in St. Bartholomew's Hospital. On application at that Institution, she was admitted under Mr. Lawrence, who, with Mr. Earle, considered an operation impracticable, as there was no laceration of the perineum, and as the genital fissure was so contracted as to preclude the possibility of applying sutures to the vesico-vaginal aperture. An ingenious and most industrious pupil of mine, Mr. Hargreaves, of Burnley, Lancashire, then dresser to Mr. Vincent in the hospital, proposed my plan of treatment to Mr. Earle; but he considered it not likely to succeed. The patient remained in the hospital for a fortnight, and was then dismissed, with the declaration, "that nothing could be done for her." My intelligent pupil thought this an unwarrantable decision, and therefore recommended the patient to consult me, and place herself under my care, should I consider any treatment likely to be of use to her. She first consulted Mr. Salmon, who thought he might cure the rectal aperture.

I saw her on the 6th of May (1831), two months after delivery. On making a vaginal examination, I experienced considerable difficulty in introducing the finger. This arose from the contracted state of the genital fissure, which was as small as that of a person at puberty, but more especially from the existence of a strong pseudo-tendinous band, which ran across the vagina, and occupied the situation of the hymen. It occupied the lower third of the vaginal orifice, and could not have escaped laceration during the passage of the infant, had it existed before delivery. On passing the finger beyond it, I discovered a transverse

aperture in the neck of the bladder, fully an inch in length, and about three lines in width; its edges were smooth and hard, and it was sufficiently capacious to admit the introduction of two fingers. There was an opening in the rectum an inch and a half in length, and the vagina was in a high state of irritation from the passage of the fæces and urine into that canal. The vulva was slightly inflamed. The urine was constantly escaping from the vagina. The general health was excellent.

The *treatment* consisted in relaxing the bowels, and keeping them in that state, in introducing as much oiled lint as was borne without pain, and strenuously advising the patient to lie on either side or on the face, so that the urine might be collected on the sound surface of the bladder, and the cause of the irritation in the vagina in this way removed. In three days the vagina was filled tightly with oiled lint, which was removed every second or third day. This plan was pursued in until the 1st of July, when the fæces no longer escaped through the vagina, and the vesical opening was contracted to the size of a sixpence. The urine escaped in diminished quantity. The fibro-membranous growth had gradually ascended towards the pubis, and formed an excellent support for the tampon or plug. The patient remained in bed during this treatment, and was allowed to sit up in the middle of July, as scarcely any urine passed through the opening unless on coughing or walking much. She suffered no inconvenience, and on the 1st of August considered herself well. At this time the fistula was scarcely perceptible; but the orifice of the vagina was nearly closed by the adventitious and already mentioned. This production must be incised, as it will effectually prevent sexual congress. The operation is deferred until exercise in the open air will remove the effects of such long confinement. The result of this case clearly proves that fistulæ of the description under notice may be cured without sutures, caustic, or cautery. It shows the importance of attending to the position of the patient during the treatment. In all the cases I have hitherto heard of in the British and French hospitals, the patient was allowed to lie on her back, and consequently the escape of the urine into the vagina, or in other words, the cause of irritation was allowed to continue. Under such circumstances, a cure could not be reasonably expected. It was unnecessary to employ catheterism in this case, as the urine was retained by the position of the patient as soon as the vagina was plugged, and it was regularly voided by the urethra.

Soon after complete recovery I proposed to divide the band, as it would inevitably prevent nuptial congress, and might lead to the re-opening of the vesico-vaginal fistula. The woman would not consent to any cutting operation, as she supposed that the openings in the bladder and rectum had been made by her former medical attendant. I lost sight of her until 1835, when I was again requested to visit her, as she was supposed to be in a dying state. The woman who called upon me stated, that there was a bone in the passage (vagina), and a profuse and offensive discharge of matter. The medical attendant, Mr. Stamp, of Blackfriars Road, considered her case hopeless.

On inquiring into the state of her sufferings, she informed me that soon after her return to her husband, the bladder became injured, and

When the placenta is implanted or attached over, or its edge near the orifice of the womb, (see *plate 37, figs. 1, 2, 3*), and that the latter is not dilated, or no more dilated than the disc of a sixpence; it will be often difficult, indeed impossible, to detect the presence of the placenta with the finger, as I have repeatedly experienced in different cases of consultations.

Professor Hatin, of Paris, one of the best writers on obstetrics in modern times, observes, that the nature of the hæmorrhage in such cases, will enable us to determine whether it arises from placental presentation, or separation near the orifice of the womb, or not. He states, that in the one case, the latter, the loss of blood is increased during the uterine contractions or labour-pains, on account of the gradual separation of the placenta; but that in the other case, the blood is effused during the interval of the labour-pains. (*Cours complet d'Accouchemens et de Maladies des Femmes et des Enfants, &c.* Paris, 1832).

But in placental presentations, the hæmorrhage occurs, in most cases, between the seventh and eighth month of pregnancy, unaccompanied by uterine contractions or labour-pains, in consequence of the development of the neck of the womb, and its separation from the placenta, when placed over it, for labour-pains rarely occur at this period of pregnancy, as the time of parturition has not arrived, and this has led Dr. Blundell to observe, that those who expect or wait for them, "act on the silly rule," and often allow the woman and her infant to be destroyed by hæmorrhage.

I have met with numerous cases of my own, and of other medical practitioners, which confirm this conclusion. But I have also met with many cases of supposed placental presentations, between the seventh and eighth month of pregnancy, which went to the full time; so that M. Hatin's opinion is entitled to its value, to a certain extent.

When the orifice or neck of the womb is sufficiently dilated to admit the introduction of a finger, the obstetrician can readily discover the presence of the placenta—a spongy substance, not so friable as a clot of blood, and bleeding on the slightest pressure. The lips of the uterus may sometimes be mistaken for it. When the placenta is not directly over the os uteri, we can often detect the membrane.

If the uterine orifice is dilatable, and the size of the disc of a shilling, it ought to be dilated with the fingers, which are to be passed through it, or at either side of the pelvis, so as to avoid lacerating the centre of the placenta when over the os uteri, the membrane ruptured, the feet of the infant grasped in the hand, and the operation of *version* performed, as already described. (See p. 211).

It is important not to separate but as much of the placenta at one side as will admit the passage of the hand, as by this means the hæmorrhage will not be increased, and the circulation will not be interrupted between the mother and infant. This method is preferable to piercing or boring the placenta in the centre, which would lacerate the insertion of the navel cord, and the infant passing through the spongy mass, the labour would be more difficult, the placenta separated, and no chance left of saving the foetus. But in some cases perforation is neces-

sary, and is performed with difficulty, on account of the thickness of the placenta in the centre.

When the placenta is pushed down by the head into the vagina, it will be expelled first, and should not be returned, although in such cases the infant will be inevitably destroyed, and cannot be saved.

The woman ought never be left in a case of placental presentation until she is delivered, and the obstetrician should never wait for, or expect labour-pains at the seventh or eighth month of pregnancy, or allow the woman to lose one, or several pints of blood, which may destroy her. (See *After-hæmorrhage*, p. 289).

Some advise waiting until the uterine orifice is dilated to the size of the disc of half-a-crown, and not to force it, or dilate it; but, in my opinion, when the hæmorrhage is so profuse as to endanger life, or require transfusion, the obstetrician ought to dilate the uterine orifice by gradually passing his fingers in conical shape through it, and perform the operation of version. (See *plate 37, figs. 1, 2, 3*).

It is to be recollected, that parturient action with dilatation of the uterine orifice may happen from the moment of conception to the completion of pregnancy; and that a cautious dilatation, or as it is very absurdly termed, “a forcing of the os uteri,” is not necessarily either a dangerous or a fatal operation. (*Vide ante*, p. 291).

Hæmorrhages are more dangerous when sudden than with slow discharges of blood, even though the quantity lost may be equal. (Denman).

Hæmorrhage during Labour.—This form of flooding is caused by a partial separation of the placenta from the womb during labour, and requires immediate delivery by some of the obstetric operations already described.

Hæmorrhage from retained Placenta, after the birth of the infant, requires the immediate extraction of the placenta. (For the operation, see *Retained Placenta*, pp. 286—288).

Spasm of the Mouth of the Womb may cause retention of the placenta, and in such case all means for its removal are to be employed, viz., venesection, warm baths, or fomentations, sedative injections, belladonna ointment, and then exciting the contraction of the womb by pressure on the abdomen, and the exhibition of the ergota or ergot of rye.

When the life of the woman is endangered, the orifice of the womb should be dilated with the fingers, in the manner already described, and the whole, or as much as possible, of the placenta extracted. (See pp. 286-7-8).

General or partial adhesion of the Placenta to the Womb may cause its detention in that organ, (see pp. 287—289), and in such cases the whole, or as much as possible, of the placenta must be brought away.

In some of these cases, the injection of cold water, acidulated by the umbilical vein, will cause, as if by enchantment, the separation of the placenta, but not invariably. In some cases, the ergot of rye will be used with success.

Increased Size of the Placenta may impede its expulsion, more especially when the uterus is firmly contracted. This may be increased by the decidual membrane being filled with blood, or the foetal surface of the after-birth being the presenting part.

In such cases, if the fingers fail to extract the placenta, or puncture it or the membrane, the hand must be introduced to extract the whole. (See pp. 286-7-8-9).

In p. 286 I have given an account of the manner of removing or extracting the placentæ in twin labours, and shall now merely add, that the placenta of the first infant is seldom expelled before that of the second, and that both may be so united as to render it impossible to discover the line of demarcation, while the enlarged mass may be thrown off with much difficulty, when passing through the mouth of the womb. M. Hatin describes a case of this kind. (*Op. Cit.*)

When the strength of the woman suffers from profuse hæmorrhage, nutritious aliment, as the vegetable jellies, sago, arrow-root, tapioca, canna-root, Irish moss, &c., and the animal broths and jellies are to be employed, in small and repeated quantities, so soon as they can be prepared.

When there is great prostration of strength, hurried respiration, great anxiety, pallidity of the face, lips, and skin; diffusible stimulants, as brandy, whiskey, rum, gin, with ammonia and opium, are to be freely administered. A pint of undiluted ardent spirit has been given to a woman who never took a table-spoonful during her previous life. Half a wine-glassful of pure spirit may be administered every quarter of an hour in bad cases—any more will induce vomiting.

When flooding is violent and extreme, and every sign of death apparent, after the free use of stimulants, the face is blanched, the respiration scarcely audible, the pulse absent, the extremities cold and clammy, the power of deglutition lost, and vomiting incessant, the life of the woman is in the greatest danger. Nevertheless, women have remained in this condition for seventeen hours, and finally recovered.

When all the means already advised have failed, we should have recourse to refrigerants of every kind, both external and internal, as affusion of cold water on the abdomen, cold and acidulated injections into the womb, and the re-introduction of the hand to press on the internal surface of the organ, with a view of exciting the contraction of the parietes, and more especially to compress the aorta, if we have failed to effect the latter object through the parietes of the abdomen. This compression is easily made in most cases after parturition, on account of the softness and flaccidity of the abdomen, and it need not be continued longer than five or six minutes to arrest the discharge of blood.

M. Trehan observes, in his memoir lately published, that aortic compression is more certain than any other treatment; it speedily suspends hæmorrhage, whatever may be the cause, or the extent, and even if there be inertia, or atony of the uterus.

Inertia, or Atony of the Uterus occurs to delicate women, who have been a long time in labour. When there is hæmorrhage the placenta should be extracted as soon as possible. (See p. 289).

In such cases, stimulants, pressure on the womb through the abdomen, the ergot of rye, or the introduction of the hand, may be necessary. I need scarcely observe, that traction of the navel cord might invert the womb, and cause its fundus or other parts to protrude externally, called *procidentia*. This has not only been induced by ignorant practitioners,

but the womb torn away, (see p. 184), and in other cases of the kind, the intestine protruded, and was also cut away in former times.

Syncope or fainting, as well as *convulsions*, may arise from tedious labour, hæmorrhage during labour, or from retained placenta. Immediate delivery and removal of the placenta are necessary in such cases. When convulsions continue after the removal of the placenta, and arise from loss of blood, causing a peculiar excitation of the nervous system; stimulants, tonics, antispasmodics, baths, fomentations, and vaginal injections, are necessary. Morphia, and the other sedative preparations of opium, combined with camphor, henbane, &c., will generally aid in relieving them.

When *asphyxia* occurs, and the patient appears at the point of death from severe hæmorrhage, the operation of transfusion alone can save her.

Transfusion of Blood.—Dr. Blundell has distinguished himself by the successful performance of transfusion on the human subject in extreme cases of hæmorrhage. He performed the operation successfully, for the first time, on a patient of Dr. Waller's, in August, 1825.

Mode of performing the Operation.—A double brass syringe, tinned on the inside, with a lateral tube, large enough to contain two ounces, perfectly air-tight, not clogged with oil or covered with a green rust, is to be selected for the operation. The instrument must be perfectly clean, and an ivory, or rather a silver tube is affixed to the extremity of the lateral one. A small funnel is sometimes attached to the barrel of the syringe, by means of which the blood passes from the arm into it, without being received into an ordinary vessel. A stop-cock is also attached to it, by turning which the communication may be opened either with the funnel, or with the extremity of the instrument. The syringe should be warmed by passing tepid water through it four or five times, care being taken not to use it too hot, as a heated instrument would tend to coagulate the blood.

The basilic or cephalic vein is to be laid bare, by making an incision over it, about an inch or an inch and a half in length, and separating it from the surrounding cellular substance. A probe is now to be passed under the vein, and pressure made on the point of contact between the instrument and the vessel. The object of this is, not to permit the blood to ooze from the vein when opened, which would impede the operation. An opening is now to be made into the vein with a clean sharp lancet, about the size of that used in venesection, to admit the point of the silver or ivory tube attached to the syringe.

The husband, or some healthful male, is to be bled from a free orifice, and the blood received into the funnel, or into a common vessel, immersed in tepid water.

The pipe of the syringe is to be immersed in the blood, and the piston raised slowly and steadily. It is now important to bear in mind that there is a quantity of air in the syringe and lateral tube, which would prove fatal if injected into the vein of the woman. To remove this, the handle of the syringe is to be turned downwards, and the point upwards, the piston being pressed on, until the blood flows from the end of the lateral tube. When this is accomplished the air is expelled, and the

operator places the point of his finger over the nozzle or end of the lateral or transfusing tube; the syringe is now raised in the horizontal or ordinary position, the silver or ivory tube is carefully introduced into the open or incised vein of the woman, and the blood is very slowly injected.

The blood ought to be injected slowly, for if passed suddenly, it may extinguish life. When the blood is injected, the tube is to be withdrawn from the arm, and the syringe well washed with tepid or cold water. Unless this is done, clots of blood will impede, or wholly prevent the action of the instrument. It is necessary to wait five or eight minutes between each injection, so as to allow the blood to circulate throughout the body.

The quantity of blood required for successful transfusion, will vary from eight to twelve ounces. It is remarkable that the pulse rises after the first or second injection, the countenance brightens, the voice returns, and the patient seems to be revived from death to life. I have witnessed this fact in a case in which I had the valuable assistance of Dr. Blundell. In that case, which we attended at Clerkenwell, transfusion was performed three times in twelve hours, and yet the woman died of hæmorrhage. (See *Dr. Ryan's London Medical and Surgical Journal*, 1832, vol. i. p. 476).

The same result generally happens after saline transfusion, in cases of blue cholera.

If the respiration ceases, death is certain and sudden.

When the woman has revived, after one or more injections, the probe is to be withdrawn from under the vein, and the wound treated on ordinary principles. Its edges are to be approximated, secured with adhesive plaister, over which a cold lotion is applied.

After-treatment of Hæmorrhage.—In a few hours reaction supervenes after hæmorrhage, with or without transfusion. The skin becomes hot, the pulse rapid, and there is a sense of noise in the ears, as if thunder or the noise of artillery was heard by the patient. These symptoms are not to be subdued by antiphlogistic measures; but by nutriment, a moderate use of stimulants, as hereafter advised, in describing the management of flooding in abortions.

Labour attended with Hæmorrhage from other Organs.—There may be bleeding from the nose, lungs, stomach, or intestines, during parturition. Delivery should be effected as speedily as possible. These hæmorrhages are to be treated on ordinary principles. The best remedy is a combination of acetate of lead and opium.

Bleeding, nitrate of potass, digitalis, and ordinary measures, may also be employed.

Convulsions.—There is no period in the life of woman at which her sensibility and irritability are so acute, as during parturition. The efforts which she makes to give birth to her foetus, often cause convulsions, &c. There are two species of this disease; the one is caused by plethora, or fulness of habit, or determination of blood to the head; the other, by too considerable loss of blood, depression of mind, or the pain of severe, tedious, or difficult labour.

The indications of *treatment* are to effect delivery as speedily as

possible; and if there is determination of blood to the brain, or the person is of full habit, to bleed freely, apply cold to the head, leeches, &c.; but when the disease arises from loss of blood, or any other depressing cause, stimulants, antispasmodics, warm baths, fomentations, vaginal injections, &c., will be necessary.

When the disease arises from over-distention of the womb, the membrane which surrounds the foetus should be punctured, and the amniotic fluid allowed to escape, and, if necessary, the orifice of the womb ought to be gradually dilated, (see p. 291); and when scirrhus, incised. (See Vaginal Hysterotomy, p. 280).

In all cases, delivery should be effected as soon as possible, by some means or other—the forceps, version, craniotomy, &c. (See these terms in the Index).

Labour with Ascites or Abdominal Dropsy.—When the abdomen is greatly distended with dropsical fluid, the action of the womb, (see p. 289), the abdominal muscles and diaphragm, may be greatly impeded, and the labour rendered tedious. In most of such cases we may safely trust to the efforts of nature; although I can suppose an instance in which paracentesis, or tapping, might be necessary. In cases of this kind, the strength should be supported, and the ergota administered.

Hydrothorax—Asthma.—When these diseases are present during labour, delivery should be accomplished by some of the operations already described, and in whatever posture most comfortable to the patient, which will be the most accordant with science. (See p. 161).

Hernia.—When hernia or rupture is reducible, it should be pushed into the abdomen during labour; and when irreducible, it should be properly supported. (See p. 301).

Contraction of the Uterine Orifice of the Neck of the Foetus.—The indications of treatment are, to remove the spasmodic contraction by sedatives, venesection, warm baths, or fomentations. The French obstetricians employ an ointment of belladonna in such cases, rubbed on the affected parts:—℞. Ext. belladonnæ, ʒj; adipis, ʒj. Fricetur, ʒj assidue, donec spasmus incipiat leniri. It has been also proposed to incise the margin of the os uteri, and to use the forceps.

Rupture of the Vagina.—This may occur in the same cases as that of the womb, and is to be treated in the same manner. (See p. 289). It is most commonly induced by an improper use of instruments; but, upon the whole, is of comparatively rare occurrence. I have given a full account of the various diseases of the vagina in this work, references to which will be found in the Index.

Presentation of the Umbilical Cord, or Navel String.—In this case, it is usual to push the cord into the uterus, when the head presents, (see plate 29, fig. 1). The great object is to prevent compression of the cord, which would interrupt the circulation of the blood, and destroy the infant.

Plurality of Infants in the Womb.—It is now on record, that there may be five infants in the womb at the same time. There are, however, generally no more than two. These may be in one or in separate membranes. (See plate 20, figs. 1, 2; and p. 286).

Some suppose that both infants are begotten at the same time; while

others contend, that each is the result of a distinct conception, to which the term superfoetation is applied.

There are many cases on record, especially in the modern treatises on medical jurisprudence, in which a full-grown infant was born in days, weeks, or months after another. It is also well attested, that the same woman brought forth a black and white infant at one birth, she having had intercourse with a white and black man in rapid succession. (See Author's *Manual of Medical Jurisprudence*, 2d edition, 1836.)

In twin cases, one infant usually presents by the head, and the other by the feet, (see *plate 22, fig. 1*), or both may descend by the heads, feet, knees, or breech. In all these cases, the usual modes of practice, as when there is but one infant, as already described, ought to be employed. If the pulsation ceases in the cord, the infant will be born dead, unless delivery be rapidly accomplished. When the cord passes through the external genital fissure, it should be returned into the womb and hooked on an extremity, (Croft); but should it descend again, Sinellie placed it in an empty leather purse, and Wallemberg, in a gum elastic bottle, and returned it.

Excessive length of the Navel Cord.—When the umbilical cord is unusually long (see p. 137), it may be encircled round the neck, body, or limbs of the foetus, and be subjected to such compression, as to arrest the circulation in it, and destroy the foetus. (See *plates 28, 29*). The practice in such cases is, to disentangle it, if possible; and if not, to incise and tie it. (See p. 183). When the umbilical cord is *too short*, it may be ruptured, the placenta separated, and the uterus forced inside out; that is, its fundus pass through external genital aperture, and be the most depending part. (See p. 184). Should the shortening be caused by the cord being encircled round the neck of the foetus, as often happens, apoplexy may be the result, and the foetus destroyed, unless the cord is incised, allowed to bleed, and secured by ligature, whenever this can be applied. This is easily accomplished when the neck is near the perineum; but in such case the cord may be loosened and slipped over the head, the shoulders being properly adapted to the outlet of the pelvis, one to the pubis or abdomen, and the other towards the sacrum or back of the mother. But even when this adaptation can be effected, the cord ought to be loosened, if possible, or incised and tied. (See p. 183). I have often met with cases in which the cord was two or three times round the neck, sometimes under the arm, round the trunk, and even between the inferior extremities; in fact, in all these positions in the same case—complications highly dangerous to the life of the infant, and very embarrassing to the obstetrician.

Rupture of the Navel Cord.—This is a rare occurrence during parturition, and usually happens after the birth of the infant, when the midwife, or uneducated male obstetrician, makes traction by the cord, to remove the placenta. (See *plate 18, figs. 1, 2*; *plate 19, fig. 3*). It may also happen when the infant is born suddenly, and more especially when the cord is too short, or encircled round the neck or other parts of the body; or when the woman is delivered in the erect posture. Canole relates a case in which the womb was inverted, and the woman died almost immediately. Rebiquet, Dupasquier, Marien, and Colombe,

have each published a case, in which there was no danger, even to the infant, and no hæmorrhage. For an account of many similar cases, see author's work on Medical Jurisprudence, 2d edition, 1836.

The practice is to extract the placenta as soon as possible. (See p. 237).

Absorption of the Placenta.—It is stated that the placenta may be absorbed, not only in early abortions, but even after parturition at the full time; but further evidence is wanted to establish this fact.

The rule of practice is, to remove the whole, or as much of the placenta as possible, after labour at the full time; but this does not apply in cases of abortion. (See p. 312).

In the preceding, remarks I have described vices of conformation of the uterine orifice, and of the external genital aperture, as well as of the vagina, which may impede parturition. (See p. 280). I have now to notice certain diseases of the external genitals, which may also, more or less, impede parturition.

Infiltration and Varices of the external Genitals.—The external genitals may be very much swollen in the last months of pregnancy, by dropsical effusion, which may greatly impede delivery, and require scarifications, though these are seldom necessary.

The pressure of the gravid womb, in the last months of pregnancy, on the large veins in the pelvis, necessarily impedes, in some cases, the return of the venous blood from the inferior extremities to the heart, and causes dilatation of the veins in the latter parts, and sometimes in the external labia.

In such cases, pressure should be made, with the fingers, on the labia, during labour, when the pain is off, and the head or other presenting part, pressed upwards into the cavity of the pelvis.

The same practice should be employed when the external labia are infiltrated with dropsical effusion. (See p. 299).

Thrombus of the Vulva.—This disease is an effusion of blood into one or both labia, or into any part of the external genital organs. The tumour may vary from the size of a nut to that of an egg. The colour may be red, livid, or black; the pain very acute, and the swelling so large as to impede parturition.

Treatment.—Cold lotions to cause resolution; but should these fail, and inflammation ensue, the part should be incised, the clotted blood removed, and, after delivery, cold applications, cataplasms, &c. employed.

Inflammation of the external Labia may occur during parturition, or be caused by the pressure of the head during that process. The latter form is most frequently observed, and should be treated as all other inflammations. Every effort should be made to prevent suppuration, but all are generally tried without success.

Abscess of the external Labia may sometimes retard labour, but this is rarely an impediment. Whenever it occurs, it should be opened with a bistoury, and the incision may be slight or deep, according to the nature of the case. Emollient cataplasms and dressings should also be employed.

Inflammation of the Vagina and Neck of the Womb may be caused by the pressure of the infant's head, or other presenting part, during par-

turition, or by manual or instrumental operations; or it may supervene after the termination of that process.

In such cases, there will be a sense of heat and tension in the pelvis, more or less pain experienced during the evacuation of the bladder or rectum; and the affected part, if examined through a speculum, will be found red, swollen, tense, and painful. Inflammation of the vagina may terminate in resolution, suppuration, gangrene, or sloughing. (See p. 289).

There may also be different adhesions, and deviations of the uterine neck and orifice, and sterility induced. The neck of the womb may also be engorged with blood, and a considerable discharge of that fluid take place from the vagina. Such cases are of frequent occurrence, and are well delineated by Boivin, Duges, D. Davis, and others. I have known the discharge of blood continue profuse for six weeks, and greatly endanger life.

Treatment.—The recumbent or horizontal position, venesection, leeching, or cupping, to the sacrum, groins, or external labia; leeching, or scarifications of the womb through a modern speculum, cold vaginal injections, perfect rest in bed, or on a sofa or couch; purgation and antiphlogistic means, must be employed. Should an abscess form, it must be treated according to the established rules of modern practice; and when induration remains, it will be generally removed by the internal and local use of iodate of potass, or some of the milder preparations of iodine, combined with morphia, &c.

Retention of Urine.—This may occur during labour, or after delivery, and requires warm fomentations to the hypogastrium over the pubes; and should these fail, the bladder must be relieved by drawing off the urine. (See Catheterism, p. 43). The pressure of the infant's head on the bladder is the chief cause of the disease. This may induce congestion, or want of tone in the organ, but rarely inflammation, though sometimes sloughing may occur. (See p. 301).

Incontinence of Urine during Labour, and after Delivery.—This disease may occur during labour, from undue pressure of the infant's head on the bladder. (See plate 12). In such case it is of little consequence, and speedily disappears after delivery.

But when it is caused by severe and long continued pressure, or from badly performed operations, there may be paralysis, or sloughing of the bladder. (See p. 301).

In the first case, the frequent use of the catheter will be necessary, so as to keep the bladder empty; and the less fluid or drink taken, the better. Purgatives, diaphoretics, &c., ought to be administered. In the second case, the treatment has been already described. (See p. 304).

Constipation and Hæmorrhoids may be present during labour by the pressure of the infant's head upon the rectum, (see plate 12), and in such cases, mild aperients, enemata, and fomentations, may be employed. When piles protrude during the pressure of the head on the perineum, care must be taken not to press upon them, while supporting the latter part. (See plate 15, and p. 181).

Emphysema.—When a parturient woman makes violent expulsive efforts, there may be rupture of the lung or trachea, and emphysema

induced. Such cases are of rare occurrence, are not dangerous, and speedily get well. I have known two cases of large bronchocele caused by the efforts made during labour.

Headache, Convulsions, Apoplexy, and Mania, may be produced from the same cause.

Rupture of the Muscles.—Madame Lachapelle describes two cases of rupture of the psoas, or psoæ muscles, both right and left. In both cases death speedily followed.

Rupture of the Sternum.—MM. Comte and Martin describe the case of a woman, aged twenty-five years, who experienced severe pain in the sternum during labour, followed by great difficulty of breathing and fever. Leeches were applied to the affected part. An abscess formed, and the patient died on the fourteenth day. On examination after death, there was found a transverse fracture of the first piece of the sternum, about a line and a half from the cartilage which unites it to the second. (*Journ. Analytique*, Dec. 1827).

This fracture was clearly caused by muscular action, made by the woman by leaning on her heels and hands against the bed, and throwing back her head at the same time, thus the extremities of the sternum were strongly forced in opposite directions, by the sterno-pubic and sterno-mastoid muscles.

DISEASES OF WOMEN.

DISEASES OF WOMEN.

CHAPTER I.

THE diseases peculiar to women may be divided into—1, those depending on menstruation; 2, those relative to generation, conception, and pregnancy; 3, to parturition; 4, to the puerperal or childbed condition; and, 5, those relative to lactation or suckling.

The most important and dangerous diseases of women are those to which they are liable after parturition, and these I shall describe first, in accordance with the arrangement of Dr. Blundell, which I consider best for practical purposes.

I am well aware that many eminent and standard obstetric authors, commence with the history of the disorders and diseases in the order which I have mentioned, which most accords with anatomy, physiology, pathology; and I have done so myself in former editions of this work; but on due consideration and reflection, I have found that puerperal diseases are most fatal, and therefore should be considered first.

It is well known to every experienced physician and obstetrician, that few of the disorders or diseases occurring before or after puberty, in the unmarried or unimpregnated state, in early or middle life, or during pregnancy, are either dangerous or fatal; while those relative to parturition, and the puerperal or childbed state are, in general, often dangerous and mortal. Fortunately for humanity, the fatality of these diseases is greatly diminished of late years, since an enlightened public have most properly and wisely decreed, to have medical advice and aid during pregnancy and parturition, and none but ignorant persons will or can object to either. I shall not offer another remark upon this point, though I am as convinced of its truth and value as of my own existence, and would undertake to prove it to the conviction of any one arrived at the years of discretion and possessing sense.

Puerperal diseases are so dangerous that they should be noticed first, while the most important of all peculiar to women, shall be duly considered and described. I shall adopt the following arrangement:—1, diseases of the puerperal state; 2, diseases in the unimpregnated state; and, 3, diseases of pregnancy.

It has long been a medical axiom, that women are more sensitive, weak, more influenced by moral and physical causes, and more liable to diseases than the other sex. The constitution is more feeble, and is peculiarly influenced by the mysterious process of reproduction, pregnancy, parturition, the puerperal state, and lactation, as well as by the other function peculiar to it. I have also to observe, that want of exer-

cise in the open air, tight lacing, and constipation, are among the most common causes of female disorders and diseases. The natural sensibility is increased during menstruation, and on this account the use of all medicines is withheld during the performance of that function, unless of sedatives, when indicated to quiet the system, or allay pain, spasm, &c.

It is also an established rule in practice to avoid all powerful remedies, of whatever kind, during pregnancy, unless urgently required, as they are, in most cases, both injurious to the woman and foetus. The same rule applies during parturition, the puerperal state, and lactation.

Nevertheless, powerful remedies may be required in all these states during urgent diseases; but this is the exception to the rule.

These facts being admitted, the treatment of diseases of women cannot be so active, as of those of the stronger sex; and we must never forget that indescribable, or perhaps mysterious influence on the female system, which predominates during the performance of any function peculiar to the sex, and is subservient to reproduction. It always guides a scientific practitioner, and causes him to be less active in his treatment of the ordinary diseases of women than of men. Common sense, as well as physiology, must convince every one, endowed with reason, that active remedies, as bleeding, leeching, purgatives, &c., and doses of medicine of any kind, cannot be used to the same extent in female and male constitutions.

In fine, the state of constitution, age, sex, habit, temperament, season, climate, and locality, must be duly estimated in the treatment of all diseases, which I have fully noticed in other works—*The Physician's Vademecum*, 1837; *The Universal Pharmacopœia, or Formulary of Hospitals*, 1839; and *the Manual of Medical Jurisprudence*, 1836.

In the following commentaries I shall confine my observations to the most important diseases peculiar to women, as the nature and treatment of all, which are common to both sexes, are precisely similar, bearing in mind the differences of constitutions, &c., and they are now well understood by every properly educated physician and medical practitioner.

I shall embrace the whole under two classes—1, the diseases peculiar to women; 2, the disorders of functions; thus classifying them according to the modern physiological system of theory and practice of medicine.

Puerperal or Childbed Diseases.—*Lochia*—*Uterine Evacuation after Delivery.*—This fluid is at first blood, which is expressed from the vessels of the womb by uterine contraction, or after-pains, so as to reduce the organ to its unimpregnated condition. The woman should not rise from her bed or walk about while it continues, as the womb is not properly reduced, and the erect position may cause the organ to fall down into the pelvis, and give rise to flooding, or to a most troublesome complaint—falling down of the womb—a disease very common to the poor, and to all imprudent women who get out of bed too soon, and before the lochial discharge has ceased. It remains sanguineous for some few days, then becomes greenish, pale and watery, and ceases about the ninth or twelfth day in general; though it may continue, in cases of delicate women, for three or four weeks, or even later.

This discharge is suppressed on the supervention of fever or inflammation, on exposure to cold, errors in regimen, vivid moral emotions, and in cases of great debility. It was formerly supposed that suppression of the lochia caused metritis and peritonitis; but it is now concluded that these inflammations induce its suppression. In such cases, leeches to the vulva, groins, and inner surfaces of the thighs, were applied, with warm fomentations, mustard cataplasms, &c., which are now scarcely ever used.

Treatment.—Daily ablution of the external genital aperture with warm milk and water, by means of a sponge. When the evacuation is too profuse, of whatever colour, it causes great debility, the strength should be supported with nutritious aliment, port wine, &c., and a combination of the acetate of lead and opium, already prescribed as an hæmastatic or anti-hæmorrhagic remedy, employed. If the discharge continues for three or four weeks, astringent vaginal injections, such as equal parts of the liq. alum. c. and water, may be used daily; and the tinct. ferri mur. given as an internal astringent.

Absence of the Lochia.—In some rare cases the lochia, or childbed discharge, is very sparing or entirely absent, without any injury to the constitution. M. Nauche, an eminent French obstetric author, mentions a case of a young woman, who after her first delivery had no lochia, nor even after her second. This is a very rare occurrence, for I have never met with one instance of the kind, and I am not acquainted with any other writer who describes it.

After-pains.—These are caused by contractions of the womb after delivery, to expel clots of blood or portions of membrane from its cavity. Some women are free from them, or the same woman may suffer from them after one confinement and not after another, or after any subsequent one. These pains are more or less severe according to the constitution of the woman, and size of the clots.

Women in first labours are generally free from after-pains, because the natural power of the womb causes the organ to contract its cavity, and expel all clots. But women who have had several infants, and who are more or less debilitated from whatever cause, are liable to inertia, or want of action in the womb, and consequently to after-pains, as a greater or less quantity of blood accumulates in the womb, and requires to be expelled.

The periodicity of the pains, the momentary hardness of the womb, the expulsion of clots of blood by the vagina, and the absence of fever and pain in the abdomen, clearly prove that abdominal or pelvic inflammation is not present. These pains may persist for three or four days, and then gradually disappear. The prognosis is favourable.

Treatment.—A direct sedative, friction on the lower part of the abdomen and womb, narcotics and antispasmodics, and the introduction of one or two fingers into the mouth of the womb, to remove any clots. Some advise purgatives and clysters.

Secretion of Milk.—*Milk Fever.*—The secretion of milk often occurs before delivery, but more frequently in a day or two afterwards, and is preceded by rigors or cold shiverings, and a slight fever. The heat and

distension of the mammæ, and the absence of pain in the abdomen, afford a correct diagnosis.

Treatment.—A mild aperient, diaphoretics, fomentations to the breasts, with a decoction of poppy heads and chamomile flowers, and afterwards the free application of almond or olive oil. The fever is very slight, never dangerous, and usually disappears in twenty-four hours. (See *Alterations of the Milk*, hereafter).

Ephamera.—*Intermittent Fever.*—*Weid.*—This is to be treated as ague. A full dose of the sedative preparation of opium or morphia an hour before the accession of the cold fit, and a proper use of quina after the sweating stage is over, as two grains every three or four hours, with diluted sulphuric acid, will speedily effect a cure. The disease may, however, continue only one day, or for several weeks, end in typhus, and prove fatal.

Miliary Fever.—This disease is produced by keeping the woman too warm, either by too much bed-clothes, or too heated an apartment. There is an eruption like millet-seeds, accompanied by a profuse perspiration of an acid or peculiar odour. The disease is in general slight and easily removed, though it may terminate in typhus, mania, or profuse diarrhœa.

Treatment.—Mild purgatives, saline effervescing draughts, free ventilation of the apartment, and the remedies for typhus, &c., when necessary.

Hydrosis, Hydrotic Fever.—This term has been employed by Dr. Blundell to designate a fever accompanied by profuse perspiration, and not hitherto described by standard obstetric authors. Some of the ancient writers used the word ephidrosis, as expressive of morbid perspiration; and a certain endemic fever, which appeared formerly in England, was called hydronoses, hydropyretos, sudor Anglicus, which was characterised by profuse sweating, and considered a species of typhus by Cullen.

Hydrosis is ushered in by cold shivering before or after parturition, succeeded by heat, and by a fluid, and often a clammy perspiration, which is never critical; the pulse is frequent, often most remarkably and rapidly increasing and decreasing in number; there is also increased sensibility of the nervous system; the secretion of milk is suspended or disturbed, accompanied by transient pain in the epigastrium and chest, with tympanites, or sub-tympanites.

The disease may terminate in resolution, collapse, or in some other affection. Its species are, 1, the ultra-malignant; 2, the malignant; 3, the acute; 4, the lingering; 5, the mutable, terminating in another disease; 6, the fugacious; and 7, the intermittent and remittent.

The ultra-malignant form may come on suddenly after delivery, and destroy life as rapidly as the strongest poison, or even the malignant blue cholera.

The malignant form may be followed by tympanites and complete collapse, in twenty-four hours.

The acute form may persist for seven or eight days, and then terminate fatally.

The lingering species may continue for seven or eight weeks.

The mutable and fugacious are often very similar, and differ from the intermittent and remittent forms of the disease, which strongly resemble ephemera, or weid.

The causes of this disease are still obscure, and perhaps unknown; the diagnosis easily established; the prognosis unfavourable; and the treatment not given, but must be varied according to the urgency of symptoms. There is no account of the morbid appearances after death, a defect which must be supplied by future pathologists.

Puerperal Inflammations. — Metritis — Hysteritis — Inflammation of the Womb.—This disease is occasionally met with after delivery, is accompanied by fever, and consists in intense *constant* pain in the uterus, but not in the abdomen, unless the peritoneum becomes inflamed; the milk and lochia being suppressed, but not invariably so. The disease may terminate favourably by profuse perspiration, diarrhoea, or hæmorrhage; or unfavourably, by suppuration, discharge of pus from the vagina or rectum, or by gangrene.

The disease may be distinguished from *hysteralgia* or neuralgia of the uterus, which is periodical, and unaccompanied by fever, and is peculiar to nervous, hysterical, and irritable women, and readily cured by anodynes and antispasmodics.

The patient complains of being unwell, of cold shiverings, of pain in the lower part of the abdomen, increased by pressure and the motions of respiration; also of a hard tumour in the region of the womb, in which there are likewise sensations of weight and tension, while the evacuations of the bladder and rectum are effected with more or less pain or difficulty. There are also pains in the loins, hips, and thighs; there is fever, the pulse frequent, the skin hot, thirst, the respiration accelerated, hiccup, and sometimes vomiting; the urine is diversified in colour; the skin may be dry, and the countenance altered or sharpened, to use a common term; and all these symptoms may be followed by prostration or sinking of the vital powers, commonly called debility or weakness, and death.

Metritis, hysteritis, or inflammation of the womb, may be complicated with peritonitis, enteritis, hepatitis, gastritis, or even encephalitis; and when acute, may continue for several days or weeks; and when it becomes chronic, may persist for several years, and induce a variety of disorganizations, from simple enlargement of the womb to its partial or total conversion into scirrhus, cancer, soft cancer, calcareous deposit, and bone. I have seen all these changes in the same organ; and in some cases it has enlarged so as to fill the whole abdomen, the weight varying from two ounces and a half or three ounces, as in the unimpregnated state, to one hundred pounds avoirdupois. Such cases are recorded by many eminent authors, and partially illustrated in the work of Professor D. Davis and that of Mad. Boivin, and M. Duges, translated by Dr. Heming.

Such diseases are of very frequent occurrence, and ought not to be forgotten, although they cannot be cured, as much suffering may be relieved. It has been, and, indeed, still is the case, that few consulting physicians or surgeons pay any attention to female diseases, unless the very small number who practice obstetric medicine. Hence it happens

that some of the most eminent have been consulted in private, as well as public or charitable practice, who never instituted a uterine examination, and were really as ignorant of the nature of the diseases, as the unfortunate applicants themselves.

Treatment.—Venesection, leeches, purgatives, diaphoretics, anodynes, as opium and calomel freely, fomentations over the lower part of the abdomen, hip-baths, counter-irritation and stimulants, should typhoid symptoms appear.

In the first stage of the disease, leeches are applied to the cervix uteri, by means of a speculum, warm baths, and fomentations; sedative vaginal injections, and enemata or lavements, are employed.

If gangrene supervenes, in which the pain ceases, it is to be treated on ordinary principles, by stimulants, ammonia, quina, wine, ardent spirit, fomentations, and injections.

When inflammation of the womb is chronic, or of long standing, for weeks, months, or years, every effort should be made to improve the general health, and diminish the flow of blood to the womb. Venesection, leeching, cupping, vaginal injections, fomentations, and cold or warm applications, according to circumstances, will be useful. Cupping on the loins, or even the application of glasses alone, termed dry cupping, will be beneficial. Some experienced authors advise a free use of mercury, both internally and externally.

Inflammation of the Appendages of the Uterus, Tubes, Ovaries, and Ligaments.—The uterine tubes, ligaments, and the ovaries, may be involved with the womb in inflammation after delivery. The symptoms are nearly similar, but the pain is more severe in the affected part. The disease may likewise extend to the peritoneum, as in hysteritis. The *treatment* is the same as in the latter disease just described.

There is another species of inflammation of the womb which deserves great attention, as it is in general a fatal disease, and its pathology was unknown until a very recent period, 1829.

Puerperal or Childbed Fever, or Uterine Phlebitis.—This disease has destroyed more women in the puerperal state than all others incidental to that condition, or perhaps peculiar to the sex.

Symptoms.—Rigors, or cold shiverings, with severe constant pains in the lower part of the abdomen and womb, within twenty-four or forty-eight hours after delivery, intense pain in the forehead and uterus, diminution or cessation of the milk and lochia, pulse from 120 to 160, carelessness about the infant, difficult respiration, nausea or vomiting, and the rapid supervention of all the symptoms of typhus.

The disease attacks women of different ages and constitutions, and in different seasons; and is rapidly fatal in the majority of cases. It is not contagious.

Pathology.—Suppuration of the veins, and lymphatics of the uterus is observed in three out of five cases of malignant puerperal fever, and may extend to the hypogastric, ovarian, and abdominal veins. The phlebitis generally exists on both sides of the uterus, and more frequently near the part to which the placenta was attached. The lymphatics may take up foetid fluids after delivery, and become inflamed. The presence of pus in the uterine vessels, and its transmission through

the general circulation, speedily causes a rapid infection of the blood, and a series of phenomena which puerperal fever indicates. In 222 cases the uterus was affected in 197, and the peritoneum in 193, and there was pus in the uterine veins and lymphatics in 134. The terms peritonitis and metro-peritonitis cannot be applied to many of the morbid alterations in puerperal fever.

It was long supposed that peritonitis was the cause of malignant puerperal, or putrid fever, as the disease was termed. But the morbid inspections, or autopsies, made by Dance, Tonnelle, Conquest, R. Lee, and many others, proved, beyond a doubt, that the disease was caused by phlebitis of the uterine veins, a conclusion which clearly accounts for its fatality, and exposes the errors of preceding pathologists. In the year 1742, the disease was considered a putrid fever, and wine, bark, ammonia, &c., were exhibited freely. This accords with the modern pathology. In 1814 it was declared to be peritonitis in this country, by Armstrong, Hey, and Gordon, and other morbid anatomists; but the antiphlogistic treatment was as inefficacious as the stimulant. This plan was effectual in peritonitis, even in the puerperal state, but not in malignant puerperal fever, arising from absorption of pus and its circulation with the blood. The German and French authors investigated the pathology of the disease in 1819 and 1824, unsuccessfully, and it was only in 1829 that the real nature of the disease was determined by Dance, Tonnelle, and afterwards by Conquest, Dr. R. Lee, and others, in this country.

Every learned and experienced medical practitioner must know the fatality of phlebitis, or inflammation of the veins in every part of the body, as well as in the uterus. I need scarcely observe, that Mr. Arnott has proved that the purulent matter formed in the veins, when inflamed mixes with the blood, and causes suppurations in the different viscera, after external injuries and surgical operations; and also that the painful swellings in the joints and extremities of lying-in women, arise from inflammation and suppuration of the veins of the uterus. (See also *Dr. R. Lee's Researches on some of the Diseases of Women.*)

Prognosis.—Generally unfavourable.

Treatment.—The free use of mercury, until the mouth is affected. Two grains of calomel every hour or two, according to some; or ten or twenty grains, combined with three grains of camphor, and a sixth or eighth of a grain of morphia at the same intervals. I have repeatedly prescribed ten doses of this kind in rapid succession, and used mercurial ointment freely at the same time, with success. In dangerous diseases we must use active remedies. I have known an ounce of calomel given in twenty-four hours, in strangulated hernia, without any bad effect, except intense salivation. Mercurial frictions over the abdomen and over the axillæ, 3ij or 3iv, every half hour or hour, according to the urgency of the symptoms. The calomel has been continued until 500 grains were exhibited, but it ought to be *always* combined with opium. This succeeds after general and local bleeding have failed, though used most freely. Oil of turpentine has also been given by the mouth, and may be applied warm to the hypogastric region and abdomen after leeching. Upon the whole, mercury is the best remedy, though it often fails.

When the symptoms of typhous or putrid fever set in, they are to be combatted in the usual manner. I have repeatedly known a cure effected by mercury pushed to the fullest extent, when all other means had failed; although, in some cases, this remedy has no beneficial effect.

Peritonitis often occurs in the puerperal state, and is ushered in by fever, constant pain in the abdomen, often in the lower part; hard small pulse; diminution or suppression of the milk and lochia. In some cases the pain is intensely acute and constant, and the disease terminates fatally from the third to the eighth day, unless active antiphlogistic remedies be employed. In other cases, there is no pain in the abdomen during life, though the usual appearances of peritonitis are observed after death. Hysterical and rheumatismal pains in the parietes of the abdomen, and intestinal irritation, are often mistaken for peritonitis.

The latter disease will be more or less fatal according to the extent of the inflammation, which may be confined to one small spot, to the peritoneal covering of the womb, metro-peritonitis, or extend along the whole reflexions of the peritoneum.

Treatment.—Venesection, leeches, warm baths, and fomentations, low diet, absolute rest, cold drinks, lemonade, orangeade, &c. Mild laxatives, internal and external use of oil of turpentine, free administration of mercury, blisters or mustard cataplasms, fomentations to the breasts and vulva, with leeches to the latter, or cupping on the sacrum, &c.

Peritonitis may be chronic, or become so; or come on without the symptoms of the acute species, when it is to be treated by the ordinary remedies.

Intestinal Irritation.—*Entralgia.*—This disease is ushered in with rigor or cold shivering, heat of skin, frequent pulse, intolerance of light and sound, headache, tenderness of the abdomen increased by pressure, constipation. It is often mistaken for peritonitis, pleuritis, and phrenitis, and may be combined with any of these inflammations. Intestinal irritation is almost peculiar to nervous, irritable, and hysterical women, who are habitually costive. The pain in the abdomen is periodical, and more intense at one time than at another, while it is constant in abdominal inflammation until relieved by antiphlogistic means; the pulse though frequent is soft, but frequent and hard in enteritis or peritonitis. The prognosis is favourable in entralgia, and doubtful, if not unfavourable, in enteritis or peritonitis. It sometimes happens that irritation and inflammation are present at the same time, but this is a rare complication.

Treatment.—The indications of treatment are, free evacuation of the bowels, blood-letting, and leeching or cupping; anodynes, fomentations, sinapisms, blisters, or embrocations; nutritious aliment and perfect quiet. Purgatives, with mercury and anodynes, generally effect a rapid cure. Copious depletion is highly injurious, unless inflammation is present, which is rarely the case. The alvine motions are dark and scybalous, and when brought to the natural colour, relief will be immediately obtained. It is most important to keep the bowels regulated during the last months of pregnancy, and when this is attended to, we seldom meet with intestinal irritation, even in those who have suffered from it on former occasions. It is of the utmost importance that the bowels should

act daily during pregnancy, and especially during the last three months, either spontaneously, or by the use of proper medicines. This ensures health and strength, so essential to a favourable delivery and a speedy recovery, or an ability to bear any operation during parturition, or the removal of any disease which may occur afterwards. I invariably employ this method in my own practice, and highly approve of it.

The aperients commonly used, as castor oil, lenitive electuary, black draught, compound infusion of senna, Sedlitz powders, &c., are far inferior to the following pills, one of which may be taken night and morning, according to its effects:—

℞. Extract. colocynth. comp., ℥ij; extract. hyoseyami, ℥j; hydrarg. chloridi, gr. x—xij; olei menthæ piperit., *mv.* In pilulas xij - xv divide.

The other aperients may be used occasionally, or alternated with these pills. (See *Dr. Marshall Hall's Commentaries on some of the Diseases of Women*).

Phlegmasia Dolens—Cruritis—Neuritis—Milk Leg.

Symptoms.—Pain in the calf of the leg, thigh, or in the pelvis, swelling of one inferior extremity, extremely painful, white, and does not pit on pressure. It may affect one or both limbs simultaneously or successively, and the diseased one may be double the ordinary size. Some contend that phlebitis of the femoral veins is the cause of this disease, but few obstetricians deny it.

Compression of the sacral and sciatic, crural, and sub-pubic nerves by the infantine head in its descent during labour, may cause neuralgia or neuritis, according to M. Duges and most moderns. The pain will be more or less severe, in the course of the affected nerve. This may be followed by swelling of the inferior extremity, or by gangrene, though the latter very rarely occurs.

According to Dr. D. Davis and Dr. R. Lee, this disease is caused by inflammation of the iliac and femoral veins, and ought to be termed crural phlebitis. It usually comes on from the fourth to the twelfth day after delivery, but sometimes after the third or fourth week.

According to the opinion of the late Dr. Hamilton, of Edinburgh, phlegmasia dolens was rarely fatal, while cruritis is generally so, and from this he concluded, that they were totally different diseases. The modern pathology, however, is, that they are the same disease, caused by phlebitis of the crural and femoral veins, and followed by low typhus fever. From what I have observed of phlegmasia dolens, it is much more fatal than I once expected, from the positive statements of one of my former masters and friends, the late Dr. Hamilton. Thus I have seen a fatal case, with Mr. Drysdale, of Kennington, Mr. Hughes, of High Holborn; which was also seen by Mr. Cholmondeley, of Nottingham Place, nearly at the same time. Nevertheless, I have observed cases which terminated favourably, without either general or local depletion.

Treatment.—Leeches along the crural and saphena veins, warm anodyne fomentations, morphia to allay pain, and to procure rest, and venesection in full habits.

When the acute pain subsides, and the limb remains enlarged, iodated

and stimulant embrocations, bandaging, acupuncture, blisters, &c., are employed to excite absorption. In some cases the limb or limbs remain enlarged for the remainder of life.

Abscesses of the Sacro-Coccygeal and Pubic Joints.—Inflammation of the pubic joint is generally concealed, from feelings of delicacy, until suppuration has happened. If allowed to proceed, there will be ulceration of the joint, separation of the bones, and lameness for months, or even years. When discovered early, the capillary growth ought to be removed by shaving, and leeches applied to the mons veneris, with cold lotions, purgation, and diaphoretics. Should suppuration happen, the abscess ought to be opened as soon as possible. When the pubic bones separate from each other, a bandage should be applied round the pelvis to keep them in apposition, and the woman ought to be confined to bed for six, twelve, or eighteen months. Fortunately, separation of this joint is of rare occurrence.

When the sacro-coccygeal joint is painful from luxation, or laceration, in women from the age of thirty to forty-five, which often happens, leeches should be applied, with cold lotions, &c.; and should suppuration occur, and the coccyx separate from the sacrum, care should be taken, to prevent the former from uniting with the latter at right angles, as in such case, the coccyx must be broken off during the next parturition. Such union is to be prevented by placing the separated bones in apposition; and this can be accomplished, in general, by passing the index finger into the rectum, and applying the thumb in apposition to it over the joint externally. In some cases the coccyx is evacuated, but this rarely happens under proper management.

When an abscess forms, it may be opened through the vagina or rectum, according to its most dependent part.

I have known injury and inflammation of the sacro-coccygeal joint to occur twice to the same woman, and a curious coincidence was, that her mother had the same disease at the same time from a fall down stairs. The latter got well, while the former, who had also separation of the pubic as well as the other joint, died in the Middlesex Hospital.

When women affected with disease of the sacro-coccygeal joint become convalescent after delivery, they cannot sit on a common chair, in consequence of the pain in the affected part, and this is another means of diagnosis.

The *sacro-iliac joints* are often painful for days or weeks after delivery. This arises from their luxation to a greater or less extent, when the infant is large and the pelvis small. Confinement to a sofa or bed, with an opiate, belladonna, or hemlock plaister, will in most cases effect a speedy cure.

Paralysis of one or both lower extremities may follow parturition, from the pressure of the infant on the pelvic nerves during labour. The disease is to be treated on ordinary principles.

Puerperal Mania is rarely an incurable disorder. It may continue for weeks, months, or years, but is generally cured by powerful sedatives, and removal of the sufferer from home. Depletion is generally injurious. Lactation may or may not be continued.

It scarcely ever recurs on future confinements. It may, however,

continue for several years, though, in general, it is cured in a few weeks or months. There may be a lucid interval every second or third day for one or more years.

The *treatment* should be soothing, as in most cases of insanity, and the woman most closely watched, both by day and night, lest she commit suicide.

Puerperal mania may also arise from intestinal irritation and loss of blood. I fully agree in opinion with Dr. Marshall Hall, that puerperal phrenitis is comparatively a rare disease, and that puerperal mania, on the contrary, is seldom of an inflammatory character; so that it is especially to be treated by means suited to the mixed case of intestinal irritation and exhaustion. (*Op. Cit.*)

Mania occurs soon after delivery, and also when the system is exhausted by lactation or suckling. There may, however, be cerebral congestion, which will require depletion, and other antiphlogistic measures; but this is a rare complication, and blood-letting, purgation, and all depressing remedies generally do more harm than good.

I have long felt the force of this conclusion, although overruled in consultation by some of my seniors, but the result was as expected. In my opinion, puerperal insanity is most successfully cured by mild measures, and not by those which lower the vital powers, unless when there are decided symptoms of too much vascular action, which is very rarely the case.

Convulsions may occur in full habits, and require depletion; or in nervous hysterical subjects, when powerful sedatives and antispasmodics are the best remedies.

Constitutional Irritation, or violent Reaction often succeeds severe hæmorrhage, whether occurring during miscarriage or parturition. There is fever, noise in the ears compared to thunder, and other loud sounds, and there may or may not be pain in the abdomen or uterine region.

In some cases the countenance and lips are pallid, the skin hot or cool, the pulse full and throbbing, as also in the carotids and temporal arteries, the respiration is laborious, with panting, sighing, moaning, gasping, catching, &c.; there is sometimes an irritative cough, with hacking, which often arises from irritation in the trachea or larynx, or exposure to cold; and there may be severe palpitation, or violent action of the heart, or tendency to fainting on the slightest motion, or on assuming the erect posture. I have repeatedly known even strong women who aborted, or lost much blood in labour, or afterwards, faint on sitting up, even a month after the hæmorrhage, a case of which is now under my care; and Dr. Marshall Hall states, that in a similar one, a lady sat up in bed to evacuate the bladder, fell back, and expired.

The patient usually complains of giddiness, pain in the head, restlessness, want of sleep, or disturbed sleep, frightful dreams, great intolerance of noise, which has led superficial observers to conclude that there was congestion or inflammation of the brain.

When the respiration is laborious, and the action of the heart much disturbed, the latter organ has been erroneously supposed to be inflamed.

If the stomach is affected with retching, vomiting, eructation, or the intestinal canal deranged with diarrhoea, constipation, and flatulency,

abdominal inflammation is then apprehended by the inexperienced. But no educated physician or obstetrician can arrive at any of these conclusions. He well knows, that if a woman has nearly bled to death by abortion or parturition, it is not to be expected that she could be attacked with phrenitis, pneumonitis, carditis, gastritis, enteritis, or peritonitis, that is to say, with inflammation in the head, chest, or abdomen. These mistakes are too often made. Dr. M. Hall has repeatedly known the effects of loss of blood to be mistaken for inflammation of the brain and heart, (*Op. Cit.*); and I have met with similar examples. But the brain is not the only part to be affected; I was called to a lady who had lost ten pints of blood, as I was informed by her medical attendant, in consequence of placental presentation, to which she had been exposed on two former occasions. The obstetrician, a famous one in his locality, sat by during this hæmorrhage, for a whole day, without any interference. The placenta was expelled first, and a dead infant followed. He was called to another labour case, which he could not leave, though requested to see his former patient. A rival was summoned, and he supposed that there was phrenitis and peritonitis; he bled the woman, who fainted on the abstraction of a few ounces. It was fortunate that she had not died; she was saved by stimulants.

In extreme cases of this kind, the abstraction of a small quantity, even a few ounces of blood, might cause death; and even a mild aperient aggravates all the symptoms; and it is on this account that such medicines ought not to be given for a day or two. It is also to be borne in mind, in the cases under consideration, that life is preserved by stimulants, of whatever kind, that there is great exhaustion, that the food must be most nutritious, and not excrementitious; and, therefore, the daily evacuation of the bowels, in a physiological or natural sense, is not necessary or required.

Treatment.—Stimulant medicines and drinks, wine, &c., the most nutritious diet, with perfect quiet, are indispensably necessary. Blood-letting, either general or local, is contra-indicated and improper, as also are purgatives. A proper use of anodynes is highly beneficial, more especially of morphia, and the sedative solution of opium.

Lactation or suckling is improper in such cases, being a cause of exhaustion or debility.

The preceding are the most frequent diseases of the puerperal state; and as the various other parts of the body may also be affected, as the head, chest, abdomen, trunk, and extremities, I purposely omit noticing ordinary complaints, which are to be treated by ordinary and established principles, which are well known to all educated and experienced medical practitioners; but most especially to those who have been educated within the last few years.

CHAPTER II.

DISEASES RELATIVE TO MENSTRUATION AND PUBERTY.

It has been long observed that women are often more or less inconvenienced at the approach of puberty, and when menstruation does not occur at the ordinary period, when it is established with difficulty, when it does not recur regularly at the adult age, and when it becomes deranged at the period of its cessation, popularly termed the change or turn of life.

Although menstruation is a natural function, yet it is often preceded by disorder or unpleasant sensations in different parts of the body, as of the womb, loins, lower extremities, heart, lungs, brain, skin, &c. It sometimes happens that at the age of puberty, the skin is thickly covered with some kind of eruption, which usually disappears on the establishment of menstruation, or by mild aperients, alteratives, warm-baths, &c.

Headaches, more or less intense, may precede menstruation when first commencing at the age of puberty; and are usually relieved by purgatives, leeches in full habits, hot foot-baths, &c., or antispasmodics in nervous or hysterical subjects. The respiration may also be laborious or difficult, there may be violent action of the heart or palpitations, or spitting of blood, all of which will be relieved by purgatives, moderate blood-letting, either general or local, and the latter may be applied to the vulva and perineum. The application of cupping-glasses to the sacrum or lower part of the spine, and, according to some, to the mammæ or breasts, three times a week, often causes determination of blood to the uterus, by sympathy, as the breasts and uterus strongly sympathise as organs subservient to reproduction, and aided by the other remedies induces the menstrual or female periodical evacuation, more especially when the girl is properly developed; but when this is not the case, improvement of the general health by means of moderate purgation, tonics, chalybeates, popularly termed preparations of steel; exercise in the open air, will be necessary to restore digestion, increase the quantity and circulation of the blood throughout the body, and, consequently, in the uterus and its appendages, produce the development of all parts, when the functions of all will be improved, and those of the uterus established in common with the rest. It is a frequent mistake in practice to prescribe emmenagogues, with a view of exciting the womb and inducing menstruation, in cases of delicate sickly undeveloped girls, in whom the uterus is not larger than in childhood, and cannot possibly perform its first function; and I have been too often consulted in such cases, when the individuals were dying of inflammation of the womb or bowels, caused by strong purgatives and emmenagogues, while, after death, the womb was found, on inspection not larger than in childhood, and highly inflamed, as well as its peritoneal covering

and the intestines. In such cases, the countenance is pale and somewhat greenish, and this has given origin to the term chlorosis.

Chlorosis.—Green Sickness.—Cullen most properly placed the disease called chlorosis among the adynamia, or those in which there is want of strength, or a torpid state of the vascular and lymphatic systems, and particularly as regards the uterus; and the moderns are of the same opinion, as it attacks delicate girls of pale complexion, and but seldom those who reside in the country, and take active exercise in the pure open air. A sedentary life renders girls debilitated, and subject to chlorosis, as we observe in manufactories, and all situations in which they are too much confined and overworked.

The disease most commonly occurs at the age of puberty, and sometimes to married women and widows, of the lymphatic or leucophlegmatic temperament, and is generally induced by exposure to debilitating causes of whatever kind; as residence in low, damp, confined situations, want of proper and nourishing aliment, defective clothing, excessive labour, or evacuations of whatever kind; an indolent life, depressing moral affections, as grief, sadness, jealousy, disappointment in love, and privation of sexual enjoyment, all of which will tend to cause atony or want of power in the uterus. Another rare cause of the disease is absence of the womb.

Symptoms.—There is want of development of the whole body, the countenance is pale and languid, the appetite depraved, with a desire for acids, unripe fruits, chalk, earth, &c.; flatulency, and pain or spasm in the stomach and bowels, the latter habitually confined or costive; palpitations of the heart, difficult respiration at times, with a sense of oppression at the chest; headache, pains in the back, loins, and inferior extremities, the mind depressed, and the temper variable or irritable, hysteria, and absence of menstruation. There is great inaction and fatigue on slight exertion.

When the disease advances, the countenance becomes of a greenish yellow colour; the whole body is emaciated, flaccid, and wan; the feet œdematous, the respiration accelerated on the slightest exertion, the pulse becomes frequent and small, and many, if not all, the symptoms of hysteria appear. The latter disorder will be described hereafter, and is intimately connected with that under consideration, and, indeed, with most of the diseases of women. The nervous system is deranged in some cases, in which there will be severe nervous headache, palpitations of the heart or syncope, or tendency to fainting, spasmodic cough, and disorder of function in many, or in bad cases, in all the organs of the body.

Some girls complain of painful sensations in the head, neck, back, chest, loins, and upper and lower limbs; while others suffer from derangement of the senses of vision, hearing, taste, smell, and touch. It is not, however, to be expected that all the symptoms just enumerated are to be present in every case of chlorosis, as they will vary, as in every case of disease, according to the intensity of the disease, and state of constitution.

The prognosis is generally favourable in chlorosis, as a cure is usually effected.

On examining the bodies of girls or women who have died of chlorosis, the blood-vessels will be generally found empty, the flesh pale, and effusions in the abdomen, chest, and pericardium, while the uterus will be undeveloped, or paler than natural.

Treatment.—The indications of treatment are:—1, to improve the general health; and, 2, to excite the action of the uterine vessels.

The first indication may be fulfilled by mild aperients, tonics, or generous diet, wine, and all means of improving digestion and health, as exercise in the open air, by walking, skipping, sailing, but particularly riding on horseback, dancing, and friction by means of a flesh-brush or piece of new flannel, all over the body. Warm woollen clothing next the skin and on the feet is highly beneficial.

The various tonics and chalybeates are employed, as those of iron, zinc, calumba combined with ammonia or myrrh; but I have found the following remedies by far the most successful:—

℞. Extract. colocynth c., ℥ij; ext. hyoscyami, ext. gentianæ, āā ℥ss.; hydr. chloridi, vel subm. hydrarg., gr. x—xij.; strychniæ, gr. j.; ol. menth. pip., mv. In pilulas, xv—xx., divide: dosis una mane nocteque.

These pills will regulate the bowels in most cases, and very much improve the general health; the dose to be diminished, if they act more than twice daily, which is by no means probable.

The following chalybeate or steel mixture may be used with the pills, not only in chlorosis, but in all cases of anæmia, or pallidity caused by debility, loss of blood, or tedious disease:—

℞. Mist. ferri comp., ℥iv.; decoct. aloes comp., ℥iij.; tinct. gentianæ, ℥j—ij.; olei menth. pip. mvj.; syrupi aurantii, ℥j. Dosis ℥ss. ter in die, horâ ante cibum saltem unâ.

When the general health is improved, which is the first and chief point, it will then be necessary to accomplish the second indication, which consists in exciting the uterus. This is to be effected by hip, foot, and general saline or simple warm-baths, the application of dry cupping, by means of glasses, to the sacrum, groins, or inner surface of the thighs, and also to the breasts alternately. Galvanism and electricity are sometimes useful. These means will be effectual in the majority of cases, though all may fail; and change of life by marriage be the most successful cure, but may also fail in some cases.

During the use of all medicinal and dietetic remedies, the state of mind must be attended to—the *moral* as well as the *physique*, as the French term it. Amusements, parties of pleasure, travelling, resorting to chalybeate mineral waters and using them, removal to the country, change of air and scene, &c., possess their advantages.

The use of the chalybeate waters, as those of Bath, Brighton, Cheltenham, Tunbridge Wells, &c., in England; Hartfell, Peterhead, in Scotland; Brownstown, Ballyspellan, Castleconnel, &c., in Ireland; Plombières, in France; Pyrmont, Carlsbad, and Spa, in Germany; Bandola, in Italy; St. Luke's, in Naples; Buzot, in Spain; Luchalaza, in Hungary; Bigova, Sarepta, Perekop, and Naphtha, in Russia. The reader will find a more minute account of mineral waters in the author's original work (1824); in the *London Medical and Physical Journal*, 1825, vol. 54; in *Tegg's London Encyclopædia*, 1828; which original

papers were condensed by Dr. A. T. Thomson, in his *London Dispensatory*, 1830, and in the author's *Universal Pharmacopæia, or Formulary of Hospitals*, 1839, 3rd edition.

It is right to remark in this place, that the small quantity of chalybeate and saline matters contained in most mineral waters, have led many to ascribe more to change of air and scene than to their efficacy, more especially when the general health is improved by the means already advised. It is for this reason that the use of such waters is rarely advised at present, unless to the higher and wealthier classes of society; and very little dependence is placed on their medicinal effects alone, unless proper and more powerful remedies, as advised above, are used previously or simultaneously. It is also to be recollected, that the majority of chlorotic subjects must be cured by medicines, and not by chalybeate waters. They are useful auxiliaries to the treatment of the wealthier portion of society.

Amenorrhœa—emansio mensium.—Absence of the menses, is used by some authors as synonymous with chlorosis, the disease only differing from it by the better development of the whole body, and the absence of the pallidity of the countenance. Others restrict amenorrhœa to the absence of the menstruation after its first appearance, independently of chlorosis. This was also termed *retentio mensium*.

There may be absence of menstruation during the whole period of life from puberty to forty-five or fifty years of age, without any injury to the health, or sign of chlorosis, and the woman may even have children; but the last result is very rarely observed. In such cases the mammæ, or breasts, are badly developed, and there is little or no sexual inclination. But it has happened, as in the case of the woman Brown, who was murdered, and her body dismembered and scattered in different parts of this metropolis by her pretended admirer, Greenacre, whom she proposed to marry, although the uterus was absent; a fact which shows that there are many other motives which lead to conjugal engagements besides mere physical impulse.

This disease is termed *amenia*, or absence of menstruation, in which there may be no injury to health; and it does not necessarily destroy sexual desire, nor cause sterility.

Dysmenia.—When the menstruation is very sparing, or passed drop by drop, or at long and irregular intervals, this state is termed dysmenia. It arises from the same causes as amenorrhœa, and requires the same treatment.

The local symptoms of amenorrhœa are, disagreeable sensations in the pelvis, sometimes pain or uneasiness; tension and weight in the hypogastric region, or in the lower part of the abdomen, loins, groins, or in one or both lower extremities; swelling of the abdomen, generally caused by flatulency; uterine pains; leucorrhœa, or whites, or yellowish discharges before or after each menstruation; and sometimes inflammation, and various other formidable diseases of the womb, cancer included.

In addition to these symptoms, every part of the body may be deranged, or its function disordered, in consequence of the anatomical and physiological fact, that disorder or disease of any part of the body,

may derange the whole. Hence there are all the symptoms enumerated under the head chlorosis. (See p. 338).

Chlorosis and amenorrhœa may be accompanied by inflammations, neuroses, or unpleasant sensations of whatever kind; fevers of all sorts; several cutaneous eruptions to the amount of over five hundred different diseases, as well as organic diseases, technically termed morbid changes of organs or parts. But in all cases of absent or suppressed menstruation, the medical adviser should ever recollect that the cause may be pregnancy, and he must be most careful not to shock virgin modesty or female honour by his inquiries, which he will never do if an educated medical practitioner; while he must take care that he is not imposed on. (See *Signs, Progress, and Duration of Pregnancy*, p. 150).

There is not a more difficult case in practice than this under consideration, yet a judicious medical observer can, in general, arrive at a correct conclusion.

Absence or suppression of the menses is not dangerous to health or life, and may continue for an illimitable period, without any serious consequence to either; but there are many cases of exception.

Foreign obstetricians advise the application of leeches round the anus, vulva, or external genital fissure, groins, and inner surface of the thighs; hip baths; fumigations and injections directed into the vagina, above the hymen, by means of a long copper or brass tube, termed clysoir.

When the menses or menstruation is absent, warm fomentations may be applied over the pubes or lowest part of the anterior surface of the abdomen; warm foot baths, either simple, composed of river or pump water, or compound, as of sea or artificial sea water, may be used with more or less advantage. Nourishing diet, consisting of vegetable and animal jellies, together with tranquillity of mind and body, and the remedies already advised, are, in general, sufficient to establish the periodical evacuation, or menstruation, as well as the general health.

When the girl or woman is delicate, the general health should always be improved by the means already advised, (see p. 339); and the atony of the womb removed by a proper use of strychnia and ergota, or ergot of rye (Nauche): useful remedies when those already advised have been fairly tried. When menstruation is suppressed by exposure to cold air, damp, &c., diaphoretics, or those medicines which induce perspiration, should be employed, in addition to the other remedies already recommended.

Lastly: when menstruation is impeded by nervousness, spasm, or moral causes, the sedative preparations of opium, as morphia, sedative solution (Battley's), or acetous tincture of the Dublin Pharmacopœia, Lancaster black drop, henbane, &c., will be highly useful, either in ordinary or increased doses, administered according to the effect produced, and on established principle. If inflammation of the womb, peritoneum, or intestines, should supervene, it must be treated upon ordinary principles. (See p. 329).

The term *menostasis* is applied to retention of the menses by some obstruction in the genitals. Retention of the menses is sometimes caused by imperforation, or other vices of conformation, by obstruction

in the mouth of the womb or vagina, or by cohesion of the lips of the external genital fissure, which is a common occurrence to delicate children, if not washed daily. In such cases, the menses may be secreted, but retained in the cavities of the uterus or vagina.

The symptoms are pains in the abdomen and pelvis, in the loins, hips, and lower extremities, sense of weight and fullness in the lower part of the abdomen; and this part increases so much in size as to present an appearance very similar to that of pregnancy, and many of the signs of the latter state may develop in succession.

The indication of *treatment* is to establish a free communication, (when this can be done with safety) between the external and internal genitals, by means of incision, large bougies, &c., and then the accumulated fluid can escape. In some cases, a membrane closes the lower orifice of the vagina, and requires a crucial incision for its removal; and the hymen may be the cause of the obstruction in other instances, when incision is also necessary.

Spasm of the mouth of the womb during menstruation, which often occurs in nervous hysterical women, may suddenly arrest the evacuation, and will be removed by full doses of sedatives, anodyne lavements, and pressure with the finger on the os uteri.

Dysmenorrhœa.—When menstruation is painful, or rather accompanied by pain, it is termed dysmenorrhœa.

The usual symptoms are pains in the lower part of the back, loins, and hypogastric region, with a sense of heat, itching, or bearing down in the vagina or womb; sometimes head-ache, anxiety, want of sleep, sense of choking at the throat; the menses, in some cases, escaping drop by drop, with great uterine and other pains, while the secretion or discharge may be mixed with coagula or clots of blood, or filaments or pieces of membrane, and then the woman will be sterile.

The causes are subacute or chronic inflammation of some parts of the inner surface of the womb, inducing constriction of the secreting vessels, or of the substance of the organ; contraction of the mouth of the uterus, or diseases of the tubes and ovaries. Spasm of the womb may also induce it, and in such cases, there may be no change of structure at first, and the woman may have offspring, but not when shreds are passed, which indicate intensity of disease, and change of structure.

It is also to be recollected, that all cases may finally terminate in change of tissue or structure, and prove incurable. There are many varieties, from nervous, spasmodic, to structural, and there may be a complication of all.

Some women are cured by marriage, or by having offspring; others have infants after the lapse of years, and more are incurably sterile, from the commencement to the cessation of menstruation.

The prognosis is generally unfavourable, unless in nervous, hysterical, or irritable women, in whom at first there is no organic disease of the womb, and who may be cured by pregnancy.

Treatment.—The treatment is the same as for amenorrhœa, as general and local bleeding in full habits, purgation, warm-baths, fomentations, &c., and the removal of any vice of conformation, whenever practicable. When the pain is so severe and violent as to induce convulsions or epi-

lepsy, large doses of sedatives, as morphia, liquor opii, camphor, henbane combined with compound tincture of valerian, guaiacum, and acetate of ammonia, in the manner hereafter described, will sometimes afford temporary relief, but rarely effect a cure.

These remedies are strongly recommended by different eminent obstetricians during the periodical attack. Professor Dewees advises the ammoniated tincture of guaiacum; Professors Masuer, of Strasburg, and Cloquet, of Paris, the acetate of ammonia; and the physicians of this country, large and repeated doses of opium, until the pain subsides. The common practice has been, until lately, to order the woman to bed, and to give her a tea-spoonful of laudanum, frequently repeated, until relief was obtained. This as often failed as succeeded, because laudanum, or tincture of opium, contains the stimulant as well as the anodyne properties—morphia, narcotine, &c. &c. (See Author's *Formulary of Hospitals, or Universal Pharmacopœia*, third edition, 1839); and hence the sedative solution called liquor opii, or morphia, which is purely anodyne, ought to be preferred, in all cases in which the object is to relieve pain, spasm, neuralgia, &c.

I have administered as much as one hundred and sixty drops of the sedative solution of opium in an hour and a half, in a severe case of dysmenorrhœa, without affording but momentary relief. Every physician of experience is aware, that anodynes may be given in very large doses in painful and spasmodic diseases, and often without any effect.

I have repeatedly found the following mixture afford great relief in painful and spasmodic menstruation, or when combined with hysteria or irritable uterus:—℞. Mist. camphor. ph. Eblanens., $\bar{3}$ vss.; tinct. guaiaci am., $\bar{3}$ vj.; liq. am. acet., $\bar{3}$ j.; liquor. opii, vel sol. mur. morphiæ, $\bar{3}$ j—jss.; syrupi aurantii, $\bar{3}$ j. Dosis cochl. amplum bis vel. ter. in die.

There should be an alvine motion daily, without, or by the use of aperient medicine.

When there is habitual costiveness, in cases of sedentary persons who are nervous or hysterical, the bowels should be acted on daily, and I have repeatedly known the form of pill, already advised, accomplish that object in a short time. Indeed, the same medicine is a safe and efficacious aperient whenever one is necessary, (see p. 333); one or two of these pills may be taken every night at bedtime, until the bowels act freely, and then one occasionally, twice, thrice, and finally once a week. When taken regularly for two or three weeks, the bowels will act spontaneously, and would be purged by a single pill, and the aperient will be no longer necessary. One grain of strychnia may be added in the formation of the pills, when there is much nervousness or hysteria, which is often the case. The mixture and pills should be regularly taken between at each return of painful menstruation, as well as all other combinations of the remedies above enumerated. The free use of the liquor opii, morphia, or black-drop, may be necessary during the intensity of the pain, at each monthly period; but these remedies, however beneficial, only afford temporary and not permanent relief.

There are cases in which there is great contraction or absolute obli-

teration of the uterine orifice. (See p. 69). When the os uteri is spasmodically or permanently contracted, much relief may be obtained by the use of metallic bougies, as advised by the late Dr. Mackintosh, of Edinburgh, M. Mellier, of Paris, and others. I have succeeded by this means, after all the usual remedies had failed, in a case in which many of the most eminent physicians and surgeons of this metropolis had not afforded permanent relief. (See p. 69). Nevertheless, bougies are often as inefficient as ordinary remedies. They can have little or no effect upon an irritable or diseased spot in any part of the cavity of the uterus, or upon diseases of the uterine tubes or the ovaries, several of which may cause painful menstruation, and be incurable.

It is, however, very important to state, that the use of bougies, of whatever kind, either metallic or wax, gradually increased in size, may be introduced through the mouth of the womb, when too much contracted, until it becomes dilated to the natural size; and the result may be, in some cases, not only a cure of painful menstruation, but a dilatation and adaptation of the uterine orifice to the function of reproduction. It cannot be doubted, I apprehend, that simple contraction of the uterine orifice, without change of structure, causing painful menstruation and temporary sterility, may be removed by cautious dilatation, and that conception may take place afterwards.

I published a remarkable case in proof of this opinion, while editor of the *London Medical and Surgical Journal*, 1837, furnished by a lecturer on surgery.

I have already observed that painful menstruation (dysmenorrhœa) may occur occasionally, and in such cases there may be offspring when the woman has no pain, at one or more menstrual periods. It is in these cases, that we sometimes observe the lapse of one or several years between the births of two infants.

There may be painful menstruation in timid, nervous, or hysterical subjects, arising from disorder of menstrual function or irritable womb, without any change of organic structure, and this is curable. But there may also be change of structure of the womb, with pain, spasm, and unpleasant sensations, which may be wholly incurable. In the former, a cure may sometimes be effected by marriage and change of circumstances, influencing mind and body; but in the latter there may be no possibility of cure. Thus I have known cases in which there was severe pain in the lower part of the abdomen every month, as well as derangement of the whole system, in which either the womb or the ovaries were absent, and, consequently, a cure could not be either expected or effected.

Suppressio Mensium.—*Suppression or irregularity of the Menses.*—The menstruation generally recurs every month, but may not come on at the expected period, or suddenly cease on its appearance, and it becomes suppressed by other causes than pregnancy, lactation or suckling, or uterine disease. This derangement may continue for weeks or months, without causing any constitutional or local disturbance; but there may be febrile excitement, succeeded by dyspepsia, lowness of spirits, flatulency, costiveness, or vicarious hæmorrhage from the nose, eyes, ears, nipples, stomach, lungs, intestines, bladder, or from an ulcer on any part

the body. This last vicarious discharge is termed *menoxenia*, or hæmorrhage, which supplies the function of menstruation.

The causes are, the application of cold and humidity to any part of the body, but more especially to the hands or feet, strong mental emotions, low diet, impure air, and every thing capable of injuring the general health, and debilitating the uterine system, as frequent abortion, immoderate sexual intercourse, leucorrhœa, &c.

A frequent cause of suppression of menstruation is pregnancy, and the physician must take care that he is not imposed upon, or induced to prescribe drastic medicines, which he is often requested to do, to cause regularity of the menses, but with a view of producing abortion. (See Signs of Pregnancy, p. 150—163).

Several cases have fallen under my own observation in which the suppression was caused by pregnancy, though very strongly denied by the patients. Obstetricians and physicians to public charities very frequently meet with such cases, and cannot be too cautious in their diagnosis.

The treatment is the same as for amenorrhœa. (See p. 339).

Menorrhagia.—*Menorrhœa.*—When menstruation is excessive, or too prolonged, the disease is termed menorrhagia. It occurs to full or spare nervous subjects, and may cause much debility and diminution of the vital powers, and excite many other disorders in different organs. The most frequent causes are, violent exercise, walking, dancing, riding in carriages, fatigue, loss of rest, exposure to a high temperature, as in kitchens, manufactories, stimulating drinks, frequent or excessive sexual intercourse, and depressing passions of the mind.

The symptoms are, weariness in the loins, headache, loss of appetite, sinking at the pit of the stomach, oppression of breathing, giddiness, and disorder of vision and hearing, succeeded by great debility, weak pulse, syncope, vertigo, leucorrhœa, or whites, and sometimes by œdema, or swelling of the insteps and feet.

The menstrual fluid does not coagulate unless mixed with blood, which may happen on account of the determination of the latter fluid to the womb, before and during menstruation.

Menorrhagia may occur during lactation, in about six or eight months after parturition, in women of full habit, who continue to indulge in frequent sexual intimacy.

The indications of *treatment* are to diminish the quantity of the secretion, which can be accomplished in women of full habit by low diet, blood-letting, purgation, diaphoretics and diuretics, leeches, or cupping on the sacrum or loins; cold lotions, as vinegar and water, applied to the lower part of the abdomen; cold acidulated vaginal injections; the tampon, or plugging the vagina, or pressing on the aorta through the parietes of the abdomen, or injections of cold water into the rectum, which are rarely necessary. The woman should be confined to bed, and lie on a hair mattress, with the hips more elevated than the rest of the body. Astringents will be necessary in bad cases, such as the infusion of roses, the diacetate of lead in solution and combined with opium, or the muriate of iron: cold acidulated drinks are useful in all cases.

When there is much debility, or the woman delicate, port wine, nourishing diet, tonics, &c., are indicated, as well as all means for the restoration of health. Cold-baths or hip-baths are often highly beneficial adjuncts. There is no use, in cases of excessive menstruation or flooding during abortion, pregnancy, labour, or after delivery, in tying the wrists, elbows, knees, or ankles, or in applying leaves of spearmint under the ribbons or other ligatures, as practised centuries ago, and still proposed by some nurses and aged women.

When menorrhagia is frequent or habitual, every means for improving the general health should be advised, and sexual intimacy interdicted in a great measure, and in extreme cases must be entirely avoided until the health is improved or restored. M. Gardien recognizes three species of the disease, the active, passive, and spasmodic.

When the disease is passive, and is caused by atony, tonics and antispasmodics, stimulants, and nutritious diet should be employed.

When the disease is accompanied by spasm, as in delicate, nervous, very sensitive or very irritable women, narcotics and antispasmodics are indicated, as morphia, opium, æther, camphor, henbane, &c. Warm-baths and anodyne vaginal injections are also beneficial. The general health should be improved by tonics, aperients, proper diet, exercise, exposure to pure air, &c. Dry cupping-glasses applied to, or under the mammæ, between the shoulders, on the lumbar or hypogastric region, are often useful by causing temporary determination of blood to the part, and thus diverting it from the uterus. This practice was advised by Hippocrates,—“*Mulieri menstrua si velis cohibere, cucurbitam quam maximam ad mammas appone.*”—*Aph.* 50, *sect.* 5.

In most cases of excessive menstruation, the general health is greatly deranged,—there is indigestion, flatulency, heartburn, pyrosis or water-brash, pains in the back, chest, loins, and extremities, lowness of spirits, and generally leucorrhœa or whites. Some women suffer no inconvenience from habitual excessive menstruation, as those in Holland, Belgium, Brabant, &c.; while others, who reside in warm climates, may die of the disease.

It is generally very injurious to health in this climate, as is proved by daily observation; and frequently excites diseases to which the individuals are predisposed, and which otherwise might have remained latent for years. My revered friend, the late Baron Alibert, well observed, in his excellent *Nosology*, that we should not consider menorrhagia dangerous as to the quantity of the discharge, but as to the bad effects of the disease upon the general health.

Menopausis.—*Menopause*—*Cessation of Menstruation.*—There is still much importance attached to the critical age of women, or that period at which the function of menstruation ceases, which in temperate climates varies from the thirty-fifth to the fiftieth year. It was long supposed that women are liable to many fatal diseases at this age; but it is now ascertained, by the most accurate mathematical calculations, that the mortality of women at the critical age is not greater than of men, indeed, some say it is less. When menstruation is about to cease, it becomes irregular, diminished or excessive, or suppressed for weeks or months, and in such cases pregnancy is sometimes suspected, and

many of its ordinary signs are present, as enlargement of the abdomen and mammæ, deranged digestion, pains in the back, loins, &c.; but it scarcely ever occurs at the turn of life. In some cases there is headache, determination of blood to the head, loss of memory, confusion of ideas, and derangement of vision, hearing, taste, indeed, of most of the functions of the body. Leucorrhœa is often troublesome, accompanied by indigestion, costiveness, hypochondriasis, spasms, and unpleasant sensations in different parts of the body. Erysipelas, and various cutaneous eruptions, boils, and abscesses, occasionally appear at the climacteric period. The mind is often depressed, there is a tediousness of life, involuntary laughing or crying, and a strong tendency to melancholy, monomania, or mania. Women of good constitution speedily get well, and generally enjoy good health after the cessation of menstruation for the remainder of life.

Nervous subjects often suffer from spasm and irritation in the uterus. It sometimes, though rarely, happens, that the uterus, ovaries, or mammæ become more or less diseased. It is also a fact, that whatever organ is predisposed to disease may become more or less deranged at the critical age; but diseases of any kind are, upon the whole, rarely developed at the cessation of menstruation.

Treatment.—The chief indications of treatment are to employ general or local bleeding, purgation, low diet, &c. in persons of full habit. When the women are delicate, nervous, or hysterical, anodynes, antispasmodics, tonics, &c. will be required.

Leucorrhœa—Whites—Blennelyteria—Utero-vaginal Catarrh.—This disease consists in a discharge of whitish or yellowish mucus from the vagina, caused by congestion, inflammation, or relaxation of the internal membrane of the womb and vagina. This catarrh is most common at the adult age, but may also affect very young girls, children, and even infants; and when of yellow colour has been too often erroneously mistaken for gonorrhœa, or contagious vaginal discharge. Indeed, it has too frequently happened, that innocent men have been charged with violation of infants and children, or very young girls, who suffered from vaginal discharge; but the distinction is easily made, as gonorrhœa does not appear for three, six, or ten days after the alleged intercourse, while the simple vaginal discharge has preceded it, or is apparent on the same day, or on the next after the supposed violation. The colour of simple leucorrhœa is whitish, milky, yellow, or greenish, according to the degree of inflammation in the mucous membrane of the vagina, of the womb, or uterine tube, and the fluid may be watery, like thin starch, or of a straw-colour, and when there is ulceration, it will be streaked, or mixed with blood. It may be effused without any pain, or accompanied by heat and pain when there is inflammation or ulceration, and in the latter form it may irritate or excoriate the external genital organs, as well as the uterus and vagina.

The quantity of the discharge varies considerably, it may be scarcely perceptible externally, or so profuse as to flow down the inferior extremities, a fact attested by many eminent obstetricians, and I have been often consulted in similar cases.

This increased secretion is most common to delicate girls, and women

who reside in low damp situations, and to those of a lymphatic temperament, who indulge in the perusal of romances and other improper works, or in genital excitation.

The disease is, however, often symptomatic of irritation in the digestive organs, or of the uterus and its appendages, and frequently succeeds menorrhagia, or excessive menstruation. When the discharge is of a yellow or greenish colour, it may become so acrid as to excoriate the inner surface of the prepuce, cause herpes or small vesicles on that part, termed herpes preputialis, and even a yellowish discharge from the urethra, which is, however, unaccompanied by heat or scalding in voiding urine, and thus differing from contagious vaginal discharge, termed gonorrhœa or blenorrhœa, though sometimes confounded with it.

The symptoms of leucorrhœa or whites are, more or less discharge of mucus from the vagina, unaccompanied by inflammatory phenomena, there is slight or great debility, paleness of countenance, indigestion and nervousness, more especially when the secretion is very abundant or profuse. The disease is often preceded by a sense of heat and weight in the pelvis, loins, groins, and thighs; languor, pains or weakness in the joints; spasm in the bowels, pruritus or itching in the affected parts; heat or scalding on evacuating the bladder, all of which will vary and often diminish after the appearance of the vaginal discharge.

When the disease continues for a long time, the patients become thin, the countenance pale, the eyes dull, the digestion deranged, and there is frequent pain in the stomach and bowels, great nervousness, and often hysteria.

Leucorrhœa is periodical or intermittent with some women, and is more urgent at one time than another with all.

It generally terminates by resolution, or disappears spontaneously on the establishment of menstruation; or it may cause sterility by diluting the semen too much, or by causing such relaxation of the vagina, as to destroy its retentive power, so that the spermatic fluid may escape, immediately after coition, or when the woman assumes the erect position. When leucorrhœa is profuse, women are sterile during its existence; but it is cured in most cases, unless when there is actual disease of the womb, vagina, or ovary, which is often the case in chronic and obstinate examples of leucorrhœa which occur after the middle period of life. A vaginal examination will enable the obstetrician to arrive at a correct diagnosis.

Treatment.—The indications of treatment are to improve the general health, and to diminish and arrest the discharge. The first is fulfilled by nutritious food, pure air, residence in the country or near the sea, exercise, abandonment of vicious habits, the proper use of wine, chalybeates, quinine, vapour or cold-baths, flannel dress, tonics, chalybeate waters, &c.

The second indication is fulfilled by the use of astringent vaginal injections, as weak solutions of alum, sulphates of zinc and iron, diacetate of lead, infusion of green tea or red rose-leaves, weak decoction of oak-bark with alum, and these must vary in strength according to the degree of inflammation or intensity of the disease. I have given a great variety of vaginal injections in two other works—*The Formulary of Hos-*

pitals, or *Universal Pharmacopœia*, 1839, and the *Medico-chirurgical Pharmacopœia*, 1838; and as these are known to all well-educated and experienced medical practitioners, I shall confine myself in this place to a few examples, for the use of apprentices, medical students, and junior practitioners, and first premise a few remarks.—Vagino-uterine catarrh is similar in its pathology or nature to common catarrh, especially when confined to the throat, and there is as much reason, in my opinion, for using astringent gargles in the one, as astringent vaginal injections in the other. I believe I was the first obstetrician in this country who enforced the necessity of this practice. I remember when young women affected with whites were kept as in-patients in our hospitals for twelve months, and were unsuccessfully treated with tonics and chalybeates alone, for as to local astringents they were never used. I may further observe, that I have been consulted in cases of eight and ten years' duration, hitherto incurable, which were relieved in as many days by the use of astringent vaginal injections, with tonics and chalybeates used simultaneously.

I am well aware of the caution and delicacy required in proposing such injections in cases of young girls and unmarried women; but even in these, the remedies may be used in nine cases out of ten, unless in the few rare instances in which there is some vice of conformation filling up the greater part of the external genital aperture, which never can be entirely closed, as the daily evacuation of the urine will prevent such an occurrence. There is in all cases an opening into the vagina at the superior commissure or angle opposite the meatus urinarius, or orifice of the urethra. There can be no difficulty in passing the pipe or extremity of a properly constructed female syringe through the aperture at this part, even when the hymen is perfect and intact; and I need scarcely contend, that all false delicacy should be thrown aside when health is to be preserved by this means, when all others have failed, and a most debilitating disease removed.

Such objections are futile in cases of those women who have had a family, and perhaps in most cases in which the individuals have arrived at the adult age.

Astringent vaginal injections may be used under the following circumstances:—when the discharge is mucous, watery, whitish, or like thin boiled starch, as in such cases there is little if any inflammation; but not when the fluid is yellow, or mixed with blood, as there is inflammation or ulceration, and then anodyne injections, and not astringent or stimulant, are indicated.

In the first class of cases the following injections afford astonishing and speedy relief in most instances:—℞. Liq. alum. c., aquæ, āā $\bar{\text{z}}$ iv; tinct. opii, $\bar{\text{z}}$ j—ij—iv. m.

A fourth part to be injected into the vagina by means of a proper syringe, or bladder and pipe, and retained in that passage ten or fifteen minutes, by pressing a napkin against the external genital aperture, three or four times a-day. There is little use in injecting this or any other fluid, and allowing it to escape immediately afterwards.

The woman should lie in the horizontal posture, in this case on her back, and the injection be used by the medical or ordinary attendant. She

should also be told to contract or tighten the passage as much as possible while the fluid is in it, and to retain the medicine for several minutes.

The injections of acetate of lead and sulphate of zinc are also often advantageous.—℞. Plumbi diacetatis, gr. v. ; zinci sulphatis, gr. iij ; liq. opii ʒj-ij ; aquæ fontis, vel rosæ ʒviij ; sit lotio, cujus quarta pars, ter quaterve in die, in vaginam, more solito, injicienda. A fourth part to be injected into the vagina, in the manner already directed, three or four times a day.

When there is pain caused by spasm, a drachm of the sedative liquor of opium, or solution of the muriate of morphia, or of laudanum, may be added to the above injection. Decoction of oak-bark and alum, in the usual proportions, may be used in chronic cases with advantage. When there is much spasm of the vagina, M. Alibert employed injections of laudanum with great success.

Dr. Jewel proposed injections of nitrate of silver in obstinate cases of leucorrhœa, but they are very seldom necessary.

Internal astringents and other remedies are used, which have a direct influence upon mucous membranes, as cubebs, copaiba, the turpentine, lytta, the preparations of iodine, and the ergota, or ergot of rye.

These medicines are employed in catarrhal and other affections of mucous membranes with great advantage.

I have repeatedly found three grains of ergota with two of aromatic powder, administered three or four times a day, accomplish a cure after all other remedies had failed. It will also remove gleet, even of long standing. Mild warm purgatives, diaphoretics, diuretics, and dry cupping, with frictions, may be used as derivatives.

When leucorrhœa is symptomatic of indigestion or irritation in the stomach or intestines, it will seldom yield before the primary disease is removed.

I have given a minute account of the pathology and treatment of this disease, as it is one of the most frequent incidental to women, and about which they are as anxious as the different derangements of menstruation.

Spasm of the Vagina.—The vagina is sometimes affected with such strong spasmodic contraction as to prevent sexual intercourse, or render it difficult or very painful. On introducing the finger, the lining membrane is dry, and not lubricated with mucus. The disease may arise from an irritable state of the vagina, womb, or ovary, which must be removed to effect its cure; but it will be relieved, in most cases, by general and local tepid baths, lotions, and anodyne emollient injections, or ointments, as a drachm of the extract of belladonna and an ounce of spermaceti or simple cerate, an eighth part of which, or a piece about the size of a hazel nut, may be spread upon muslin or lint, and introduced into the vagina once or twice a day.

Much benefit will also be derived from a belladonna or opiate plaister applied over the loins; and it is to be recollected that the former, if used in too great a quantity, may derange the vision, or suspend the function for a few minutes, and then the plaister should be removed.

Some obstetric authors confine their accounts of diseases of puberty to those already described, and then proceed to notice those of pregnancy,

the puerperal state, and lactation; but this is an imperfect method, and not based upon anatomy, or the number and structure of organs, as described in the first part of this work. I shall, therefore, follow the scientific arrangement of Dr. Burns, and divide the diseases of women into two classes: 1. Those which affect the external genital organs; 2. Those which affect the internal; and thus embrace the whole of the diseases peculiar to women from puberty to the turn of life. The limits by which I am circumscribed in this work compel me to notice a vast number of diseases and subjects, the leading features or signs of which can only be described, but the indications of treatment will be faithfully given. My great object in this volume is to supply as much information as possible in the smallest space, and to place before students the heads of a branch of medicine of the highest importance to all classes of society.

Diseases of the external Organs.—Diseases of the Vulva.—Under this head are to be included diseases of the external labia, nymphæ, clitoris, meatus urinarius, or orifice of the urethra. The reader will find an account of the structures and uses of these parts in the first chapter of this work.

Diseases of the Labia externa.—There may be congenital absence of the external labia, or they may be destroyed by gangrene or corroding ulceration, often induced by erysipelas in delicate children, or women of bad or broken down constitution, or in unfortunate intemperate prostitutes. In the last named subjects the vagina, meatus urinarius, bladder, and womb, are often partially or totally destroyed. I have fully described such cases in another work, *Prostitution in London*, which accords with M. Duchatelet's account of Prostitution in Paris. These destructive diseases are also common to women advanced in life, to those who suffer from malignant ulceration or cancer, many cases of which have fallen under my own observation. Erysipelas of the parts under consideration is common to delicate and infirm children, who reside in low and unhealthful situations, many of whom may be affected during certain unaccountable states of the weather; and such cases have given rise to false and unjust charges of female violation, remarkable examples of which will be found in the writer's work on *Medical Jurisprudence*, 2nd edition, 1836. I need scarcely remark that the violence, contusions, and varied injuries to which the degraded portion of women are subjected, whose constitutions are seriously injured by intemperance, by the brutal conduct of profligate and intemperate wretches of the other sex, often cause the most fatal diseases.

Contusion of the Labia.—The loose texture of the cellular tissue of the external labia renders them liable to ecchymosis and sanguine infiltrations, either from the introduction of foreign bodies, or in consequence of parturition. The parts become considerably swollen, and of a red or livid, or black colour, from their pendant position, and the tumefaction is generally very great. The inflammation is seldom so severe as to terminate in gangrene; it often ends in abscess; but, in most cases, the extravasated blood is soon re-absorbed, and the organs regain their natural condition.

Treatment.—When there is but a slight injury, and only simple ecchy-

mosis present, cold applications, such as compresses wetted in vegetable water, or even cold water alone, will be sufficient. Absorption may be assisted by a uniform compression, by means of an appropriate bandage.

When the contusion has been more severe, and especially where there is a considerable effusion of blood, the application of leeches becomes necessary; they should be applied to the surrounding parts, but not on the injured surface, to avoid that inflammation of the skin arising from their bites, which often occurs in these cases.

When the compress is inapplicable, or when it causes pain, the use of cataplasms is advisable; they should be at once emollient and resolvent; as linseed meal, or bread and a decoction of marsh mallows root, a tea-spoonful of liquid acetate of lead may be added. The patient should repose on her back to favour the return of the venous blood towards the heart, which will necessarily lessen it in the affected part.

When the injured part suddenly exhibits well marked symptoms of inflammation, and the tumefaction quickly enlarges, the skin being uniformly red, hot, tense, and painful, in place of astringents we must employ emollient and topical resolvers in order to promote suppuration. When there is manifest fluctuation, the abscess should be freely opened, to allow of the escape of the blood and pus.

The use of anodyne cataplasms should be continued after the abscess has been opened, to subdue the inflammation that may supervene. When all symptoms of inflammation are removed, we may use slight astringents with advantage to reduce the swelling, and to promote cicatrization.

Cold saturnine lotions combined with tincture of opium, and assiduously employed, are also beneficial. The tumefaction is sometimes very considerable during the last month or two of pregnancy, and cannot be removed by any means, though it generally disappears in a few hours after delivery. This remark is equally applicable to dropsical swellings of the lower extremities, from the hips to the feet, as I can attest from repeated observation in numerous cases.

Phlegmonous Inflammation of the Labia.—There is another inflammation which is developed in the external labia without any apparent cause. Newly married women are very liable to its attacks; but those advanced in life very rarely suffer from this disease. There is nothing peculiar in the symptoms of this inflammation, except the great tumefaction that accompanies it, which generally terminates in suppuration in twenty-four or thirty-six hours.

Phlegmonous inflammation requires antiphlogistic treatment, such as cold applications, emollient cataplasms, aperients, low diet, as well as leeches to the surrounding parts.

Suppuration is the usual termination of this inflammation. When an abscess forms, it ought to be opened by a longitudinal incision on the internal surface of the affected labium. These abscesses are extremely painful, and from their situation, the patient has a great objection to have them opened. I attended a lady in Essex who had an abscess of this kind for seven years, and was greatly distressed when I stated that it required to be opened. During its existence she had no children.

After a few days' reflection I was requested to open it. The operation was simple, though the anterior wall or covering of the abscess was very thick, and required a deep incision, the pain of which was only momentary. An extremely foetid, purulent discharge escaped; a rapid recovery of health was the consequence, and after the lapse of twelve months, from the day of the operation, the patient had a son and heir, to the great joy of herself and her husband.

It is important to observe, that some women, fortunately few in number, are subject to the abscesses under consideration every month. These abscesses, like the former, may reappear for weeks, months, or years.

Treatment.—They ought to be opened in due time, and proper remedies applied; but should these fail, the walls or internal boundaries of the abscess may require to be injected with a solution of sulphate of zinc, or equal quantities of port wine and water, which will inflame their surfaces, cause them to adhere together, as in hydrocele, and thus a perfect cure may be effected.

There is often much derangement of digestion and the general health, which must be restored by appropriate remedies.

Erysipelas of the Vulva sometimes commences in the labia, and at other times it extends from the surrounding parts. This disease is known by swelling of the great and small labia, by the crimson colour, and by the intense pain that it causes, the suppuration and superficial eschars which supervene in most cases. It may rapidly terminate in gangrene, accompanied by typhus, and followed by death in a few days.

This disease may attack female children at certain seasons, present the appearances of external violence, and cause unjust suspicions of rape having been committed. (See Percival's *Medical Ethics*, and Mr. Kinder Wood's paper in the *Medico-Chir. Trans.*, vol. vii.)

The *treatment* of this inflammation is simple. The chief object is to prevent vicious adhesion of the inflamed parts, the vagina should be frequently injected, or a cylindrical pledget of lint, steeped either in a strong mucilaginous decoction, or smeared with lard or simple cerate.

Prurigo of the Vulva may affect only the exterior of the great labia, but most frequently it extends to the interior and to the pubis. The itching is so great as to derange the health and to embitter life. This disease must not be confounded with the itching that attends certain eruptions and venereal vegetations which attack the genitals; nor with that which depends on the presence of pediculi, or on a tendency to a varicose state of the parts.

Causes.—Want of cleanliness, by neglect of daily ablution, acrid discharges, the approach of menstruation, the state of pregnancy, the derangement or cessation of the menses, are among the most common causes of this disease.

Symptoms.—This disease usually begins with an itching, that increases in proportion as the sufferer scratches, and often becomes intolerable, and has led to threats of committing suicide. On examining the affected part, we perceive very minute and almost imperceptible spots, slightly pointed, which closely resemble aphthæ in the mouth, and which similarity led Dr. Dewees to propose the borate of soda as a remedy.

The itching is intolerable at night from the heat of the bed, or more especially at the approach of menstruation, during pregnancy, when no remedy will relieve it, until parturition occurs, and it is also very obstinate at advanced age.

When the disease is severe or long continued, the vesicles or blisters burst, and form small ulcers, which may disappear or become covered with brown crusts, the cuticle exfoliates, or is hardened, the digestion is deranged, the tongue or cheeks become affected with small white blisters, similar to those under notice, the general health suffers, the body emaciates, and the patient despairs of a cure.

Treatment.—The first object is to improve the general health by aperients, tonics, and all means for that purpose; and the next is to apply mild astringents, such as alum, acetate of lead, sulphate of zinc, oxymuriate of mercury, nitrate of silver, iodide of lead, combined with narcotics, to the affected part. All these may, however, fail, and then the application of nitrate of silver must be used. In some cases, cold water or lotions will give relief, in others, warm narcotic fomentations succeed. Hydrocyanic acid, spirit of wine, in the form of lotion, may be used with advantage in some cases. Medicated baths and fomentations are often beneficial, but all remedies fail until the general health is restored, or delivery happens. In some cases, the disease is so urgent as to set decency at defiance, and the part must be rubbed almost incessantly at certain times, but such cases are of rare occurrence, and a cure may be generally effected.

M. Gardien has found that a blister applied to the inner surface of one of the thighs, is the most certain remedy. When pruritus arises from the presence of insects, strong mercurial ointment, or a solution of oxymuriate of mercury will destroy them, and accomplish a cure. I have met with many cases of this disease which continued, in despite of all remedies, for weeks or months, and were finally cured. In those obstinate examples the sufferers become dejected, and often despair of a cure, though ultimately agreeably disappointed.

Carcinoma of the Great Labia.—The symptoms of this disease, which will be noticed in treating of cancer of the uterus, are developed at first on the great labia, and progress rapidly, causing engorgement and tension of the smaller labia and the rest of the vulva.

Before the disease causes enlargement of the inguinal glands, it may be removed by cauterisation. If the glands are affected, the only remedy is excision of the diseased part. The effusion of blood is sometimes so great as to require the use of the actual cautery. The bleeding is usually checked by the use of a tampon, kept in its place by a T bandage. A catheter should be passed into the bladder to allow the passage of the urine. When carcinoma affects the small labia only, the treatment must be precisely the same.

Oedema of the great Labia.—This disease most frequently affects pregnant women. It sometimes, however, supervenes from other causes, and chiefly in certain dropsies. The great labia are swelled, semi-transparent, indolent, and pit on pressure; they sometimes acquire such a size as to impede locomotion.

Treatment.—The dispersion of this oedematous swelling may be at-

tained by well applied compress, together with the constitutional treatment indicated in dropsies, such as laxatives, diuretics, and mild diaphoretics. When these remedies fail, and the œdema is an obstacle to parturition, slight punctures may be made on the great labia with an acupuncture needle.

When this disease is sometimes inflammatory, and may be accompanied by febrile symptoms, it is much more serious, and may then induce inflammation of the uterus. Should this complication supervene on simple œdema, the most prompt means should be employed to combat it. Leeches should be applied to the internal and superior portion of the thigh, but not on the inflamed part. Emollient applications are also indicated.

Cysts of the great Labia.—It occasionally happens that cysts become developed in the external labia. They are very readily distinguished from all other tumours by being round, moveable, and frequently affording fluctuation. They generally arise in a gradual manner, without any symptoms of inflammation. They usually contain a serous or watery fluid. In some cases they burst spontaneously and form fistulous openings, which are healed with difficulty.

Treatment.—These sacs may be opened or removed with a bistoury or pair of scissors. When simply opened, their internal surface ought to be cauterized with nitrate of silver. In some cases there may be profuse hæmorrhage, which may be suppressed by compression, though the actual cautery may become necessary. The last remedy is very rarely required.

Fibrous Tumours of the Labia.—Fibrous tumours may become developed in the substance of the external labia, and may be mistaken for scirrhus. They are generally round and firm, and unaccompanied by pain. They closely resemble cysts, from which it is often very difficult to distinguish them; but this is of little consequence, as extirpation is necessary in both cases. This operation is easily performed with a bistoury and the finger, to separate the tumour, which is united to the adjoining parts by loose cellular tissue. When these tumours are large, and extending into the pelvis, between the vagina and vicinal parts, they may greatly impede procreation and parturition, and are removed with great difficulty. Fortunately, they are of comparatively rare occurrence. They are easily distinguished from scirrhus and cancer, by the absence of lancinating or darting pain, the want of stony hardness, the leaden coloured countenance, and the other diagnostics of cancer.

Varices (Varicose, or Enlarged Veins of the Labia.)—A varicose state of the veins of the labia is of rare occurrence, though it may be induced by excess in venery, contusions, and laborious or instrumental parturition.

It is easy to distinguish these varicose tumours from all others in the labia, by the knotty and enlarged appearance of the veins, their softness and diminution on compression, and their bluish colour, as in the leg, thigh, or anterior surface of the abdomen. These tumours may become irritated, inflamed, and degenerate into bloody fungous ulcers, which are cured with difficulty. In some cases, the woman suffers from an

intense and almost incessant pruritus or itching, which becomes almost intolerable.

When the varices are recent, they usually disappear as soon as the cause which induced them is removed, and by means of the following remedies: cold astringent applications, as Goulard's lotion, decoction of oak bark with alum, with a small portion of camphorated spirit, constantly or frequently applied; conjugal separation, compression by means of lint, &c.

When the varices are irritated or inflamed, leeches, followed by the use of warm, and in due time, by cold applications, will be necessary. In those cases in which ulceration occurs, the solutions of the chloride of lime or soda, properly diluted and combined with laudanum, are highly beneficial. In some cases, a lotion of iodide of potass, with laudanum, is also efficacious.

Wounds of the Labia.—Wounds of the labia are sometimes inflicted maliciously, and also accidentally, by means of the injudicious application of obstetric instruments. Life has been destroyed by wounds of the labia, vagina, and uterus. (See my *Manual of Medical Jurisprudence*, 1836.)

It often happens in natural labour, that the inner edge of the inferior angle or commissure of the vulva is lacerated to a greater or less extent, and the laceration may also extend to the perineum or space between the genital aperture and anus, to the sphincter ani, and even to the rectum. When the frœnum or fourchette, or the inner surface of the inferior commissure is torn, it usually heals in a few days, by keeping the parts in apposition and applying tepid or cold lotions.

Partial or total laceration of the perineum is often caused by too sudden or too violent pressure of the infantine head, shoulders or hips, during parturition, when any of these parts are coming into the world. In such bad cases, the woman becomes disgusting and insupportable to herself, and is exposed to many inconveniences, such as descent of the vagina or uterus, difficulty or incapacity of retaining the fæces, ulceration of the vagina, rectum, &c.

The best means of preventing the recurrence of the lacerations under notice, is to moderate the labour when it is too rapid, by supporting the perineum while the head, shoulders, or hips of the infant are passing through the vulva.

Union or Cohesion of the Labia.—The external labia may be partially or wholly united to each other in new-born infants, but more commonly during childhood. This disease may also happen from inflammation of the genitals occurring spontaneously, or resulting from difficult labours, burns, wounds, syphilis, &c.

When the cohesion is congenital, it may be complete, and cause retention of urine, and in such case it will be necessary to divide the membrane which usually forms the adhesion, by a longitudinal incision made with a bistoury, and then to keep the parts separated from each other by means of oiled lint; and, lastly, to prevent their re-union.

But when the agglutination of the labia occurs after birth, and has been caused by ulceration, it is always incomplete, as the passage of the urine preserves an opening near the superior angle or commissure.

The disease often remains undiscovered until the age of puberty, when the prevention of the periodical or uterine evacuation excites attention. In such cases, a judicious and prudent physician will inquire of the mother, or other female friend of the girl, whether there is any malformation, and examine carefully to ascertain the actual state of the labia, hymen, and external genital organs. The operation will be the same as just described; but care must be taken to prevent uterine inflammation, which may follow, and terminate fatally.

Complete cohesion of the labia will prevent sexual congress; it may also occur after fecundation, and render parturition extremely difficult, indeed, impossible in some cases, unless an incisive operation be performed. In these cases, incision is indispensable; in others, the use of bougies will effect a cure.

Absence of the Labia.—Absence of the labia may be caused by primitive organization, but more commonly in consequence of gangrene, or eroding ulceration. In the latter cases, there may be partial or total obliteration of the vagina or urethra, and these canals must be dilated by bougies, incision, &c. It is scarcely necessary to observe, that congenital absence cannot be remedied, and more especially, as there is generally obliteration of the vagina or uterus.

The labia, nymphæ, clitoris, vagina, uterus, ovaries, and uterine tubes may be affected with cancer and all other diseases of soft parts, which are to be treated on ordinary principles.

Diseases of the Nymphæ, or smaller Labia.—The nymphæ, or inner labia are liable to all the diseases of the external or larger labia, and to certain vices of conformation.

Excessive length of the Nymphæ.—This is a common disease in Africa and other warm climates, and I have occasionally met with it, in a slight degree, in this country. In such cases, the nymphæ protrude beyond the external labia, cause irritation, and great inconvenience. This disease may give rise to inflammation, ulceration, cancer, &c.

Treatment.—Nymphotomy or excision is the remedy for this disease, and is performed with a pair of scissors. Each nymphæ is successively removed, and the hæmorrhage arrested by cold astringent lotions and compresses. A saturated solution of alum, or a lotion of dilute sulphuric acid is the best.

It is seldom necessary to place a ligature on the bleeding vessels, but this may be required in some cases.

Cohesion of the Nymphæ.—This is a rare congenital disease, and usually results from inflammation. It is to be treated as cohesion of the external labia.

Inflammation of the Nymphæ.—Inflammation of the nymphæ may occur in children, but is more commonly induced by difficult labours, contusions by foreign bodies, and syphilitic infection.

The application of leeches to the labia, warm anodyne fomentations, as decoctions of poppy heads, marsh-mallows, warm fomentations with warm water or milk.

Fungous tumours of the Nymphæ.—It very rarely occurs that pediculated fungous tumours are attached to the nymphæ or smaller labia,

which are red, fleshy, spongy and painful. These tumours may be induced by local irritation of the affected parts, or may be developed spontaneously, like similar growths in other parts of the body, without any evident cause.

As these tumours bleed profusely on being incised, it has been advised to remove them by ligature or caustic, in preference to the use of the knife; but the experience and judgment of the operator must determine the best method.

Diseases of the Clitoris.—These diseases are extremely rare in this country, and the most frequent are scirrhus, cancer, cauliflower excrescence, and abnormal elongation.

When the situation of the clitoris is considered, and the function which it is said, or rather supposed to perform in the act of reproduction, it must appear surprising that it is so rarely affected by any disease.

There may be instances, which I believe to be extremely rare, of elongation of the clitoris requiring excision, but these are scarcely recorded by British obstetric authors.

In some rare cases described in foreign medical journals, excision was performed and the hæmorrhage arrested by means of ligatures, or the actual cautery. Such is also the practice in cases of cancer, but as all the adjoining parts are affected, as well as the clitoris, excision of the latter organ would be both unjustifiable and useless. It is very rarely the seat of cancer, and is mostly affected when the disease advances from adjacent parts.

Diseases of the Meatus Urinarius, or Orifice of the Urethra.—The orifice of the urethra may be closed by a membrane at birth, which will prevent the infant from passing water. In such cases an incision should be made with a lancet or bistoury, when the urine will immediately escape. This obliteration is much more common to male than female infants, and will be found to exist in many cases, in which the urine is not passed for some hours after the birth of the infant.

The orifice of the urethra may also be inflamed after parturition, and so swollen, that it will be difficult to introduce a catheter. I have been often called to cases of this kind in which it was extremely difficult to discover the orifice, and nothing but a recollection of the position of the urethra could enable me to pass the instrument. In some cases it may be necessary to use the catheter night and morning for several days, in consequence of the torpid state of the bladder after parturition, and the swollen condition of the meatus. Lastly, the latter part may be affected with cancer or syphilitic ulceration, which are to be treated on ordinary principles.

Venereal Chancres of the Vulva.—Venereal ulcers or chancres may appear on any part of the vulva, vagina or neck of the womb, and develop as on the penis.

The disease commences by the appearance of a small red spot, then a vesicle or blister which bursts, and next an ulcer or sore, depressed in the centre and covered with a tenaceous yellow matter, which is removed with difficulty, the edges of the sore being red, thickened, and elevated.

The disease is communicated by the contact of venereal matter with

any part of the mucous, or lining membrane of the vulva or vagina, becomes absorbed, although there is no puncture or wound, but in the same manner as the virus of small or cow-pox, or that which causes hydrophobia.

If on the first appearance of the red spot, or the vesicle, caustic were applied, a prevention of infection would be accomplished, in the same manner as when the virus of cow or small-pox after inoculation is rubbed off by accident, the disease is not communicated; but unfortunately, medical advice is scarcely ever obtained at this primary stage, an ulcer is allowed to form, and the use of caustic is unavailable.

It is highly important to state, that there may be one or more chancres in the vagina, or on the neck of the womb, while the vulva and labia may be free from disease; and this fact which has been repeatedly proved of late by M. Ricord, and others, by means of the speculum, accounts for the transmission of venereal infection, when there was no appearance of the disease externally.

Chancres on the external or internal labia are sometimes accompanied by inflammation, and such swelling as to obliterate the external orifice of the vagina. They may be rapid or slow in their progress, may affect adjacent parts, and may perforate the urethra, and recto-vaginal septum, thus causing vesico-vaginal and recto-vaginal fistulæ, or openings between the bladder and vagina, and between the former and rectum, most painful and distressing diseases, (see p. 301, and *plate 12*.)

It is sometimes difficult to form a correct diagnosis of chancres of the vulva, but the history and progress of the case will in general lead to a correct conclusion. Common ulcers differ widely from venereal, and are not cured by mercury.

In some cases there may be rapid sloughing, but as all forms of venereal disease are now so well understood, and so accurately described in standard works, I deem it unnecessary to notice them fully in these pages.

I shall only observe, that as timely use of nitrate of silver, the mercurial or black lotion, mercury, sarsaparilla, with iodate of potass, and nitric acid, are the best remedies.

In some cases there are *excrescences* or elevated ulcers on one or more parts of the vulva, and the margins of that aperture may be covered with them, rendering sexual intercourse very painful, and even impracticable.

In such cases the above named remedies should be employed, both internally and externally, with fomentations, anodyne cerates, &c.

Diseases of the Vagina.—The diseases of the vagina are extremely numerous as might be expected from the many important functions the organ performs, and deserve great attention. There are many vices of conformation of this part, as shortness, contraction, imperforation, obliteration, opening into the bladder or rectum, lesions by contusion or external injury, inflammation, gangrene, laceration tumours, and many other diseases which will be described in the following pages.

The vices of conformation or congenital diseases of the vagina are seldom discovered before the age of puberty or womanhood; and then if menstruation does not occur medical advice is generally obtained, and some of the above named diseases detected.

There may be *absence of the vagina*, but this is an exceedingly rare occurrence. The canal may be short or very much contracted, cases of which have been presented to me in practice, but some may be relieved by the use of bougies, gradually enlarged, and properly curved. Wax instruments which may be properly bent are to be preferred to gum elastic. I have known gum elastic bougies of large size which would admit of no curve, used with great injury to the patient, and in some cases inflammation of the womb, peritoneum, and bowels was induced, and destroyed life. The natural curvature of the vagina must always be recollected, when instruments of any kind are about to be employed, (see *plate 3, fig. 2; plate 12, fig. 1; plate 14, fig. 1.*)

The vagina may not be more than an inch in length, instead of three or four, and the womb may be absent. In such cases, the disease is incurable. In some cases the vagina may open into the rectum or bladder, and not externally, and these are also irremediable. It is worthy of remark that conception and parturition have occurred in the former case, as attested by unimpeachable evidence in the modern works on medical jurisprudence. The vagina may be affected with inflammation, suppuration, gangrene, ulceration, disorder of function, as pain, spasm, irritability, &c., like all other muscular parts of the body.

A portion of it may be protruded internally, may be invaginated, may be pressed upon by hernia (vaginal enterocele), or by the bladder (vaginal cystocele), or it may be lacerated, in those cases in which there is great disproportion between the ages and sizes of the sexes; as in those cases in which men, or those nearly arrived at the adult age, violate very young infants or children, a most extraordinary and perhaps unprecedented example of which I shall record in this section.

The vagina may also be very seriously injured, lacerated, inflamed, or gangrened, by the introduction of foreign bodies, as well as by violence during sexual congress. It is also liable to many other diseases recorded in the different chapters of this work, which cannot be noticed in this section. I shall notice some few.

Descent of the Mucous Membrane of the Vagina, may occur in cases of debility, when there will be a soft tumour projecting through the labia, or vulva. This projection may happen superiorly, inferiorly, or laterally.

It should be pushed back and astringent vaginal injections employed, by means of a proper syringe, or by pieces of lint or muslin, wetted with an astringent lotion, and introduced into the vagina, two or three times daily. One end of the cloth may be left externally, so that the patient may withdraw it, as often as advised; and she should be informed that there is no danger whatever to be apprehended if the whole piece of cloth is introduced, as it cannot possibly pass into the mouth of the womb, or into the bladder or bowel, and can always be withdrawn with the fingers.

Elytrosis—Elytrocele—Invagination of the Vagina.—This term is applied to descent of the whole, or a part of the vagina, either in that canal or externally, especially when the woman is in the erect or sitting position, accompanied by tenesmus, or an urgent, and sometimes an incessant desire to evacuate the bowels, although there is only a mucous or slimy discharge, often streaked with blood, and no regular motion.

There is also pain on evacuating the bladder, and a sensation as if the bowels were about to protrude through the vulva.

This disease differs from prolapsus, or falling down of the vaginal mucous membrane, as it commences at the superior part of the canal, while the other may begin at any part of it.

On passing the finger the invagination is easily discovered, and the mouth of the womb can be felt without any difficulty. The disease always accompanies prolapsus, or falling down of the womb, while descent of the mucous membrane of the vagina may be present, in the absence of the latter disease.

When the mucous membrane of the vagina, or that part itself partially descends or protrudes at the vulva, there will be more or less irritation, or inflammation, ulceration, &c. ; and these will be prevented by the recumbent or lying position, astringent vaginal injections, used two or three times daily, pessaries, but most effectually by pregnancy. There are, however, some cases in which the lower and posterior surface of the vagina projects and forms a pouch near the lower bowel, which can be felt with the finger, and this occurs in women of sedentary habits, and who are subject to costiveness.

I know a lady, aged thirty-four years, the mother of five children, who has had this form of the disease under notice for ten years without suffering but very slight inconvenience from it. When the vagina becomes relaxed by leucorrhœa or whites, or by genital excitement, the bladder may descend, as also some portion of the intestinal tube, and cause rupture. This is easily understood by referring to the natural position of parts, as delineated in *plate 3, fig. 2*; and *plate 12*.

Vaginal Cystocele.—The bladder may descend and push the anterior and superior surface of the vagina before it, (see *plates* just referred to), and cause hernia, which is designated vaginal cystocele.

This disease is induced in women of lax fibre, by the pressure of the diaphragm and abdominal muscles during respiration, laughing, coughing, straining, &c., which may push the bladder into the vagina, below the womb, when a soft tumour will be formed, which may descend to, or through the external genital aperture, in which there is a sense of fluctuation on pressure.

If vaginal cystocele occurs in the last month of pregnancy, and is present when parturition commences, a most remarkable example of which I have already recorded in these pages, (see p. 305), it may impede delivery, and should be replaced, if possible.

M. Chaussier has recorded a case, which occurred soon after delivery, which impeded the evacuation of the lochial or childbed discharge, until he restored the bladder to its natural position.

Treatment.—The indications of treatment are to restore the bladder to its natural position, and to retain it so by passing a large sponge into the vagina, and advising the woman to lie on either side, and occasionally on the anterior surface of the body, popularly termed on the face. Astringent injections into the vagina should be used daily, (see p. 349, 350), and the urine drawn off with a catheter, in certain cases. Pessaries are often useful, and when withdrawn every night, the vagina should be gradually contracted by means of astringent injections.

Another form of vaginal hernia deserves attention, as when a portion of intestine presses upon this part, and is designated vaginal enterocele.

Vaginal Enterocele is induced by the causes mentioned in the last disease. Women who have had many children, or suffer from whites, or falling down of the womb, are very liable to it.

The disease may come on very slowly or suddenly, by coughing, straining, or by a fall; when the patient feels a sudden descent, or sensation of bearing down, with more or less pain in the loins, groins, and inferior extremities, and frequently in the vagina, bladder or rectum; on making a vaginal examination the nature of the tumour will be readily discovered, by any one conversant with the relative position of pelvic organs.

The hernia should be reduced, and a pessary of proper size passed into the vagina, to prevent it from re-descending; and the latter passage should be contracted by means of astringent injections. There are some cases incurable, but fortunately they are of rare occurrence.

Foreign Bodies in the Vagina.—Foreign bodies are sometimes introduced into the vagina, and should be extracted in the axis of the outlet of the pelvis, (see *plate 2, fig. 1*,) as soon as possible; for if allowed to remain for several days they will inevitably cause increased vaginal discharge, irritation, inflammation, suppuration, and ulceration.

I have been frequently called to remove pessaries which had been allowed to remain for several years in the vagina, and caused the above named diseases, and some of the instruments are now in my possession.

It is, in my opinion, a great error to allow pessaries or any other foreign bodies to remain in the vagina for days, much more for weeks, months, or several years, as they must do injury, and cause painful disease; and I am utterly at a loss to comprehend any reason for this practice, which is as contrary to physiology, as it is to common sense.

I have, however, repeatedly removed wooden and gum elastic pessaries, when there was a foetid purulent discharge, and great derangement of the digestion and general health.

In some cases, the vagina was ulcerated, and greatly contracted on the foreign substance, and much difficulty was encountered in withdrawing the latter. In one case, a box-wood oval pessary had remained for three years, there was offensive purulent discharge from the vagina, and it was necessary to pass a finger into the rectum to prevent the instrument from moving while it was perforated through the contracted vagina with a common gimlet. The perforator was then introduced through the opening to enlarge it, and when this was accomplished, a craniotomy forceps was passed, so as to seize the internal and external surface of the pessary, which was withdrawn through the axis of the outlet. Vaginal injections were subsequently employed, and a cure of the purulent discharge was speedily accomplished.

In another case, a large gum elastic pessary with an aperture in the centre, had remained in the vagina for five years. There was a copious offensive purulent discharge. The index finger was passed through the opening in the centre, and the instrument was then extracted edgewise, through the axis of the outlet of the pelvis. Astringent vaginal injections with narcotics were employed, with tonics for the restoration of the

general health. The woman gradually recovered, and I advised her that if ever she had another instrument passed, and that it caused any pain, she should have it immediately removed. I lost sight of her for three years, when I was again requested to see her, as it was supposed she was dying: I found her sinking from abdominal, and I thought uterine inflammation. I enquired whether she had had another instrument (pessary) introduced, and she replied in the affirmative; and also stated that it had been passed a few days ago, since which she suffered from more or less pain, and that she attributed her present condition to its use. The pulse was irregular, the extremities cold, and death evidently approaching. I passed the index finger into the vagina, and felt a very large gum elastic pessary, one edge of which pressed firmly against the womb, and the other against the inner surface of the perineum. I could not remove it, and the woman was in such pain, that she requested me to desist. She died in two hours afterwards. I requested permission to examine the body next day, which was granted. I first endeavoured, in the presence of two students who then attended my lectures, to remove the pessary but could not, nor could either of them. On exposing the pelvic organs to view, the instrument was found in the situation above described, the womb was highly inflamed, as also the peritoneum and intestines. I need not add, unless for the information of my junior readers, that had the pessary been properly introduced, and turned horizontally when in the vagina, as should have been done, the woman's life would not have been endangered.

I shall describe the proper use of pessaries hereafter, in the section on prolapsus or falling down of the womb, and also the great danger of not withdrawing them every night, or very frequently.

I shall merely observe in this place, that the irritation and ulceration of the vagina, caused by the long continued presence of pessaries in the vagina, may cause fistulæ or openings between the urethra, bladder, or rectum and vagina, for the same reason as undue pressure of the infantine head during tedious parturition; and these unnatural openings are termed urethro-vaginal, vesico-vaginal, or recto-vaginal fistulæ, the nature and treatment of which have been already described. (See pp. 285, 286; 301—306).

I might give the histories of several cases of these diseases, about which I have been consulted, and many which have been under my own care, but I have already given an account of their pathology and treatment. I beg to direct the reader's attention to two cases in the pages immediately succeeding, for much information of great value and importance.

Elytroitis—Elytritis—Inflammation of the Vagina.—Acute inflammation of the mucous membrane of the vagina may be caused by the introduction of foreign bodies when hard or large, irritant injections, as turpentine, &c., manual or instrumental operations during parturition, the passage or retention of acrid fluids from the womb, excess of sexual intercourse, and venereal infection. The disease has been termed leucorrhœa (see p. 347), vaginal catarrh, and vaginitis. It is accompanied by pain, heat, dryness of the mucous membrane, and redness, which may be seen through a proper speculum, and when inflammation

extends to the womb, there will be pain in that organ, and should it extend to the mucous membrane of the urethra, there will be pain and heat on evacuating the bladder. In a short time, there will be an increase of the mucus, or a purulent discharge, the nature and treatment of which have been already described. (See p. 347).

In simple acute elytritis, the disease usually terminates by resolution in a day or two; but when intense, blood-letting, leeching, warm baths, emollient and narcotic injections may be required.

When it is caused by venereal infection, termed gonorrhœa, or blennorrhagia, the discharge continues for several days, or even weeks, as in the other sex.

Inflammation, laceration, and gangrene of the vagina, may be caused by rape, when committed by an adult on young children; or in girls or full-grown women, who introduce hard foreign bodies themselves, or when introduced by those who have violated them. Two most remarkable cases have been recently (March, 1840) tried in our criminal courts, which deserve most attentive consideration. The medical evidence, in the first, was kindly furnished to me, and can be fully relied on; the other parts I have taken from the published report of the trial. The medical evidence in the other case was given by a most industrious fellow student of mine, bears authenticity in every particular.

Andrew Hume, a private in the 38th regiment, was tried at the Spring Assizes held at Nenagh, in the north division of Tipperary, March, 1840, for having violated the infant of another soldier, named Anne Hall, whose age was eleven months, less by two days, and of which injury she died on the following day.

The mother swore that the deceased infant was in perfect health when she gave it to the prisoner to carry for her on the march; that witness, and prisoner, and other soldiers' wives went into a public-house, where they drank a glass of whiskey each, and the accused went out of the house, walked on fast with the infant in his arms, and was lost sight of by a winding turn of the road, and that he was out of sight for close on half an hour. "I came up to him; he had the child standing on the grass, facing towards his knees, and he was bent over the child; with one hand he held the child's petticoats up, and his other hand was covered with blood. He said, 'Oh! Mrs. Hall, your child is passing blood!'"—The child was covered with blood. I rolled the child up in a shawl, and walked a mile and a half, to Templemore, and called on Dr. Kingsley. The child died next evening, and Mrs. Adams, when washing the child, perceived its person was injured, and gave a most appalling account of it."—*Nenagh Guardian*, March 28, 1840.

Dr. Kingsley favoured me with the following particulars, and, in a subsequent note, left me at liberty to publish his communication.

"Anne Hall, aged eleven months, less by two days, violated by a private soldier, named Andrew Hume, of the 38th regiment, on the morning of Saturday, the 28th of December, 1839, on the march from Roscrea to Templemore.

"The external appearances observed at two o'clock on Sunday, by the undersigned, about twenty hours after the outrage was committed, were as follows:—the whole of the external genitals were found in a torn state;

viz., the perineum very much so, as were also the labia minora, and adjoining mucous membrane of the labia majora, and the clitoris; in fact, the whole vulva or genital fissure presented a large, lacerated wound, in a high state of inflammation. The child was in a state of collapse, and died in a few hours after my visit, having survived the injuries inflicted on her only thirty hours.

“*Post Mortem Examination.*—The external appearances were as detailed above; the vagina was found very much dilated, and longer than natural, its extremity was torn from its attachment to the neck of the womb, posteriorly, causing a large torn opening between the uterus and rectum, directly into the cavity of the abdomen, where a quantity of bloody serum was found effused.

“I examined Hume’s person a few days after the outrage; the glans penis was a little excoriated, and the penis small.”

EDWARD KINGSLEY, Surgeon, Fever Hospital and Dispensary.

The prisoner was found guilty, and sentenced to be hanged on the 30th of April; but his sentence was finally commuted to transportation for life.

This case clearly proves the ignorance of those who consider it physically impossible that a rape can be committed by an adult on children of tender years. They cannot be aware that girls of ten years are prostitutes in most large cities.

The other remarkable case of rape, illustrating the importance of medical evidence, was tried at the Cork spring assizes, 1840. A low-sized, middle-aged, and tolerably well looking woman, named Sarah Fleming, charged three brothers, and another person, with having violated her person on the night of the 21st of September. She had acted as a nurse in the North Infirmary. She swore that her assailants had tied her up to a railing, leaving her person exposed, and that she was found in that state in the morning, which fact was proved by a policeman. During the assault, they, the prisoners, fastened a rope round her neck, and stuffed her mouth with hay or grass. Drs. Howe, Evans, and Hovendin, testified by oral and written evidence, the latter and last being dead at the time of the trial, that on her admission into the infirmary, the morning after the assault, there was no indication of violence to justify the charge of violation or rape; upon which the crown gave up the prosecution, and the prisoners were acquitted.

She admitted, upon her cross-examination, that this was the third time she had appeared against the prisoners; once, when one of them violated her daughter, aged eleven years, for which he was confined for six months; next for having violated herself, when there was an acquittal; and on the present occasion.

The following facts were attested by Dr. Howe, in the *Cork Southern Reporter*, and as they are calculated to enable medical practitioners to detect imposition, and preserve the lives of innocent men, unjustly accused of female violation, as well as corroborative of the causes above alleged of vaginal inflammation, I quote them in these pages.

When this woman was brought to the North Infirmary, on the morning of the 22nd September, she continued for some time in a state of appa-

rent insensibility. Her mouth was stuffed with a quantity of dry grass, and a piece of cord was firmly tied across it in the manner of a gag. On her chest were slight contusions, and the wrists were firmly bound together with pieces of thick whipcord. On removing her clothes, the neck of a common black bottle fell from between her thighs upon the floor. When questioned, after some time, as to the cause of being found in this situation, she told pretty near the same story as detailed at the trial, with some particulars which did not appear in the evidence. She said, that after each of the three Callaghans had violated her, they forced either a stick or some other hard substance, and afterwards the neck of a common black bottle, into the vagina—that they stuffed her mouth with grass, and gagged her; that they bound her wrists together, and having tied her clothes over her head, suspended her by cords from the railing of the window, where the watchman found her. Dr. Howe, under whose care she was placed, made a strict examination of her person a few hours after her being brought into the hospital. There were no marks of bruises upon the thighs, nor any appearance of violence about the pudenda. Considerable indentations had been left about the wrists where the strings had been tied, and when a hand was applied to the contusions on her chest, she screamed, and appeared to suffer great pain. She expectorated bloody saliva in quantity, and with consummate art developed the several symptoms which may be expected to follow the injuries she pretended to have received. During the day her depositions were taken, and the Callaghans were committed to prison. Dr. Howe distrusted her story from the commencement, but the consistent and collected manner in which she told her dreadful tale produced a strong impression in her favour on the minds of many, and the extraordinary facility with which she simulated the appearance of disease, and produced the symptoms of febrile action, seemed for a time to give some probability to her statement. To throw her off her guard, it was resolved to seem to place implicit reliance on the truth of every thing she said, and to treat her with the greatest commiseration. Impostors of this description always overact their parts, and so it was with this wretched woman. About ten days after her being received into the hospital, a little before the hour of visit, a stream of water was seen flowing from under her bed: on being asked what was the matter, she said she had lost all power over her bladder, having felt it torn when the Callaghans forced the bottle into her body. Dr. Howe immediately passed a catheter into the urethra, and making an examination, per vaginam, found the parts in a natural and healthy state. Two days after this occurrence she began again to expectorate bloody saliva, spitting upon the floor, so as to attract attention, and complained of severe pain in the chest, the consequence, she said, of the injuries she received the night of the assault. Her mouth being examined, it was evident that her gums had been scratched, and that the bloody saliva had been produced by sucking them. She was now taxed with deceit, and accused of having invented a false and horrible tale, with intent to swear away the lives of three innocent men. She listened with an air of calm resignation, and replied, with gentleness, “God forgive you, gentlemen, wait awhile, and you will see how you wrong me.” That

night, when it became dark, she found her way into the Lock ward of the infirmary, from which she was turned out by the nurse-tender. The evening after I paid a late visit to the hospital, and missing Sarah Fleming from her bed, I searched for her, and found her again in the Lock ward. Being asked what she wanted there, she appeared much confused, and made an equivocating answer. These apparently trivial circumstances deserve attention from what afterwards occurred. In a week after, having been reproached as an impostor, and subsequent to her nocturnal visits to the Lock ward, she requested Dr. Howe to examine her, as she felt some soreness about the vulva. He did so, and found venereal chancres apparently in the first stage of formation:—hearing the character of these sores pronounced, the miserable woman triumphantly exclaimed, “See, gentlemen, how you wronged an innocent woman: as God may judge me, I got this disorder from the Callaghans the night they assailed me.” Information of this circumstance was immediately conveyed to the prisoners, and they were examined by the late Dr. Evans, who gave a certificate that none of the three brothers presented the slightest trace of the venereal disease. It was not possible to obtain any positive proof of this woman’s having procured the venereal virus from some of the patients in the Lock ward of the infirmary, and thereby infected herself for the purpose of substantiating the accusations she brought against the Callaghans: her conduct, however, after the trial, showed that this wicked woman could be guilty of any act which she thought likely to support the tissue of falsehoods she had invented, to gratify her revengeful malice. It must also be borne in mind, that Sarah Fleming had been for some time a nurse-tender, both at the House of Industry and in the North Infirmary, where she must have gained a knowledge of the habitudes of diseases, and the modes of producing them, which could not have been acquired by a woman in any other walk of life.

On the trial, Sarah Fleming gave her testimony in a calm and collected manner, and the material points of her evidence were not in the slightest degree shaken by the cross-examination of counsel. The more revolting and horrible the accusation the more readily did it appear to gain credence with the greater number of persons in the court, for it was easier to conceive the prisoners guilty of the crime imputed to them, than to suppose the woman deliberately fabricating such a connected train of fearful circumstances, planned with the intention of destroying the lives and characters of three innocent men, and exposing herself to the serious punishment that awaited the detection of her impostures. In this case also, the testimony of the watchman and police constable corroborated the story of the prosecutrix. Persons of this description generally give their evidence with a strong colouring to favour a conviction; and the agitated manner of Patrick Callaghan, when arrested in his house, was pointedly put forward by the witness as a proof of guilt. The prisoners did not come before the court with unblemished characters. One of the brothers had been convicted and imprisoned for six months for a felonious assault on the young daughter of the prosecutrix. Their acquittal was owing to the fact, that their accuser, from the moment of the alleged outrage, had been placed under strict medical

inspection; and their lives would have been forfeited had it not been for the evidence of Dr. Howe.

After the trial, Sarah Fleming was committed to the city gaol, upon an indictment for perjury. In the May immediately succeeding the March Assizes, I undertook the medical charge of the prisoners in the city gaol for my friend Dr. Nugent, who had gone to London, as one of the deputies from the medical practitioners of Munster, to watch the progress of the Medical Charities' Bill, then before Parliament. I found Sarah Fleming in the infirmary of the prison, confined to bed, in consequence, as she boldly asserted, of the injuries she received the night she was assailed by the Callaghans. When she was informed that she was to be placed under my care, she broke out into the most violent invectives—heaped upon me every reproachful epithet, and cried, “That as I had helped to ruin her character in the North Infirmary, I was now come to persecute her to death in the prison.” After some days, I saw that she was really ill. and with some difficulty succeeded in calming her indignation. She seemed to be suffering under some very severe abdominal disease. There was great swelling and tenderness of the whole belly, but, more especially, above the pubis. The stomach was extremely irritable, immediately rejecting every thing she swallowed. Her pulse 130, and very small—tongue foul and parched—skin hot and dry. With all these palpable indications of disease, her manner led me to distrust her. I asked to see the alvine evacuations, which, fortunately, had been kept, and found them perfectly natural. On seeing me smile, she said quickly, “You may smile, but look at my urine.” The urine was abundant, but heavily loaded with ropy mucus, and deeply tinged with blood. In the bottom of the chamber-pot was a very curious looking sediment, which I found to consist of powdered mortar and ashes. The appearance of the urine was both perplexing and suspicious. From the quantity of ropy mucus and blood mixed with urine, together with the swelling and extreme tenderness on pressure over the pubis, I could not fail to recognise an inflamed state of the bladder; but, at the same time, the admixture of the powdered mortar and lime had been evidently done with the intention of deceit. This combination of true morbid symptoms, and palpable efforts to give a deceptive character to the urinary discharge, induced me to adopt some rigorous precautions before venturing on any active course of treatment. I directed her bed to be placed in the centre of a large room, removed from the walls and fire-place. I ordered her to be closely watched, and that all her discharges should be carefully removed the moment she passed them, and kept for my examination. The next day I found Sarah Fleming alarmingly ill—the tension and pain of the abdomen had much increased—she could not bear the slightest pressure over the pubis, and the discharge from the vagina was much increased and very offensive. In spite of the most determined resistance on her part, I made an examination, per vaginam, and found the vagina completely blocked up with a large solid body, which, with much difficulty, I extracted, and found to be *a large rough paving stone!* This miserable victim of her own wicked arts turned to me and exclaimed, “God forgive you, that is the stone the Callaghans forced into my body, and the

doctors at the Infirmary could not make it out." —My friend, Mr. Dillon, demonstrator at the Royal College of Surgeons, Dublin, had accompanied me that day to see the prison, and assisted me to remove the stone, which weighed seven ounces. It must have been lodged for some time in the vagina, as it was thickly coated with a white calcareous incrustation, and layers of thickened mucus. For more than a week this woman's life was in imminent danger. High inflammation of the uterus and coats of the bladder, involving the peritoneum, took place, accompanied by deep ulceration and sloughing of the mucous membrane of the vagina; and, for some days, I was apprehensive the case would terminate in recto-vaginal fistula. I may remark, the infirmary of the prison opened into a garden, to which the invalided prisoners had access, and in which were heaps of stones of the same description as the one removed from this woman. During nearly three months that Sarah Fleming remained under my care, she continued to simulate a variety of diseases with a perseverance, and a fidelity of execution, that excited my amazement. Her intention was evidently to multiply proofs, that the several ailments under which she appeared to suffer, were the results of the injuries inflicted upon her person by the Callaghans, and of the injudicious treatment adopted by her medical attendants. At the ensuing August assizes, Sarah Fleming was tried before Baron Richards for perjury, convicted, and sentenced to transportation. Mr. Murphy, the governor of the city gaol, informed me afterwards, that, from the moment of conviction, the demeanour of this woman became completely changed, and that the report of her conduct on the passage to New South Wales was very favourable.

Inflammation, both acute and chronic, as well as ulceration and gangrene of the vagina, may be caused by the discharge of the flesh and bones of a blighted foetus, which may occupy months, or years in being expelled. The gradual, yet constant discharge keeps up irritation, and sanious discharge from the vagina. I have now a case under my care in which the discharge of an embryo of the third month has continued for eighteen months, and the mouth of the womb is as contracted in a woman of forty years as in a girl of ten.

Stone in the bladder may likewise cause ulceration, and an opening between that organ and the superior surface of the vagina, (see p. 283.) A stone may also be arrested in the unnatural aperture, and induce inflammation, and suppuration of the vagina, a remarkable instance of which fell under my own care, (see p. 302.)

Rupture of the Vagina may be caused by sexual intercourse, or rather violation of infants, (see p. 364), or by the introduction of hard foreign bodies, as pieces of wood, iron, glass bottles, knives, &c., and likewise by the improper use of obstetric instruments. In such cases, the intestines may protrude through the vulva, or external genital aperture, or during parturition the foetus may escape into the abdomen, and require to be extracted with the hand passed through the opening, or by means of gastrotomy, (see pp. 283, 285, 286, 289, 301.)

When rupture of the vagina occurs in the recto-vaginal septum, or substance which forms the posterior and inferior part of the vagina, between this canal and the rectum, (see *plate 3, fig. 2, h,*) there will be

inflammation, suppuration, ulceration, and recto-vaginal fistula, (see pp. 285, 301, 303.) In such cases, the fæces will pass into the vagina, cause irritation, inflammation, suppuration, ulceration, and great constitutional derangement, as I have observed in different instances. The health is extremely bad, conjugal intercourse rendered impossible, and infidelity or jealousy, too often the consequence.

The best mode of *treatment* is plugging the vagina with oiled lint, in the manner already directed, (see pp. 302, 304).

The recto-vaginal septum is often indurated by internal piles in the last month of pregnancy, but will be restored to its healthful condition soon after delivery, either spontaneously or by the frequent use of appropriate and mild aperients, (see p. 321), or lavements.

I have repeatedly found thickening or induration of this part in the same woman during one parturition, but not in subsequent ones, which proves that it may be readily cured by appropriate remedies.

Polypous and other Tumours in the Vagina.—I have already observed, that various tumours situated in, or attached to the vagina, may impede parturition, and require to be removed, (see pp. 281, 284.)

Polypous tumours may be attached to any part of the vaginal canal, vary in size and form, but are most commonly globular. Some have a small or slight, and others a large or broad, neck or attachment. They are hard and indolent, and sometimes protrude through the external genital aperture. When very large, they may fill up the cavity of the pelvis, impede sexual congress, as well as the evacuation of the bladder, and rectum, the menstrual discharge, and even locomotion or walking. They also cause a sense of bearing down, with pains in the back, loins, and inferior extremities. They never become cancerous. I have met with cases in which there was great difficulty in passing the finger into the vagina, and in some of these the patients were anxious to have my opinion, as to the propriety of their entering into matrimonial contracts, and likewise as to the safety of parturition. Polypous tumours of, or in the vagina, develope very slowly, as in all other parts of the body, and continue a long time without causing any unpleasant sensation.

They must not be confounded with, or mistaken for, vaginal hernia, protrusion of the bladder, or descent of the intestine or omentum.

The diagnosis is easily drawn, by remembering that hernia will be reduced by pressure, and the recumbent or lying posture, and again protruded when the compression is removed, or the person assumes the erect or sitting posture; and also by coughing, laughing, crying, sobbing, sneezing, straining, dancing, &c., while the polypous, or other vaginal tumours, will remain in their usual position under all these circumstances.

The prognosis is favourable, as the tumour can be removed, in general, by placing a ligature on its neck, and tightening this daily, or as often as the patient can bear it, as in cases of uterine polypus, which will be described hereafter. When a uterine or vaginal polypus impedes the birth of an infant, it may be removed by incision or laceration as already described. (See pp. 281—284).

Besides the diseases already described, the vagina is liable to derangement of function and structure when the adjacent organs are

affected, as the womb, ovaries, bladder, rectum, the viscera of the abdomen, chest, and head, as there is an intimate nervous connexion between all parts of the body. This sympathy is very strong between contiguous organs wherever situated, and hence disorder or disease of one part will affect the adjacent organs, and when violent, all parts of the body, to a greater or less extent.

There is another cause, and this is similarity of structure; thus, the vagina, womb, bladder, intestinal canal from the mouth to the anus, and all outlets of the body are lined by mucous membrane, and disease or pain in any part of it may derange the whole.

It is on this account that diseases of the womb, ovaries, bladder, urethra, and rectum, and even of any part of the mucous membrane, from the lips to the rectum, or of the throat, windpipe, lungs, nose, eyes, ears, &c., may affect that portion which lines the vagina, and *vice versa*.

This position might be proved by numerous illustrations, but a few will suffice.

An infant who is teething, or has worms, suffers from diarrhœa, excoriation of the anus, urethral or vaginal discharge, picks its nose, has the mucous membrane or lining of the nostrils, mouth, lips, or ears inflamed or excoriated from frequently picking or scratching these parts. Worms in the bowels may affect the brain, sight, hearing, taste, smell, skin, rectum, vagina, &c. &c., as may any other disease.

It therefore follows, that diseases of the womb, bladder, and rectum, or lower bowel, will not only affect sympathetically, or from contiguity, all these parts, which being supplied by branches of the same nerves, but also from similarity of structure by mucous membrane, not only each other, but all parts of the body in different degrees, according to the state of health, predisposition to disease, season, climate, habits, occupations, and all other circumstances which derange the health. In fine, it is a medical axiom which cannot be disputed, that disorder of function, pain, or unpleasant sensation, and change of structure in any organ or part of the body, may disturb or derange the whole.

Diseases of the Uterus.—The womb is the most liable to diseases of all the organs of woman. The disorder which precedes the establishment of menstruation, the congestion, or determination of blood in the organ before and during every subsequent recurrence of the monthly secretion, the influence of sexual intercourse, masturbation, conception, pregnancy, parturition, and lactation, predispose it to numerous derangements of function, and diseases or changes of structure. Besides these, there are many vices of conformation and congenital diseases which deserve careful study.

Vices of Conformation.—There may be partial or total absence of the womb, occlusion of its cavity or neck, as well as a division of the organ.

I might cite numerous distinguished obstetric authors, who have recorded such cases, but shall content myself with a few examples.

The orifice of the womb may be obliterated by a membrane which will prevent the escape of the periodical secretion as well as conception, and when the orifice is obliterated after the latter state, it may impede parturition as already stated, and require incision.

In such cases a metallic sound may be carefully introduced into the mouth or neck of the womb, or a stylet through a tube, and the membrane perforated (see *plate 40, fig. 8*), and when the occlusion prevents parturition, an opening may be made with a bistoury to admit the escape of the infant's head and body. (See p. 280).

Contusions, wounds, inflammation, suppuration, ulceration, gangrene, and many other diseases of the womb arise from the same causes as those of the vagina described in the preceding pages.

Contusions and Wounds of the uterus rarely occur in the unimpregnated state, or when the womb is empty, unless by criminal and brutal violence.

Such wounds may be discovered by their situation, which cannot always be detected during life, by the discharge of blood from the external genital fissure, by pains in the loins, groins, inferior extremities. Sharp instruments and substances of different kinds may be driven into the substance of the womb, either through the vagina or abdomen, to induce abortion, as will appear by the succeeding statements, but they generally fail to accomplish the criminal object, and cause hemorrhage or inflammation, suppuration, ulceration, or gangrene of the injured parts, and usually destroy the lives of both mother and foetus.

Contusions inflicted on the abdomen of a woman advanced in pregnancy may injure, inflame, or gangrene the womb, or rupture the organ, as well as injure, and, according to many, fracture the bones of the infant. Such violence is offered by brutal husbands and others, and sometimes for the purpose of producing abortion. (See various modern treatises on Medical Jurisprudence).

I may here observe, that this is a question which arises in courts of justice, even as regards inferior animals. In illustration of this statement, I beg leave to mention a case, the importance of which will not at first view be appreciated by some of my junior and inexperienced readers, though very apparent on looking to the result.

Dr. Blundell, Dr. Merriman, and myself, were once called to attend as witnesses at one of the courts at Westminster, to give our evidence as to the possibility or probability of a contusion inflicted by kicking the abdomen of a sow, causing fracture of the cranium of one of her young while in the womb, and also inducing premature delivery. None of us could speak from personal experience or knowledge as regarded such animals, and therefore we were not examined in open court. A verdict for heavy damages was awarded against the defendant. It was proved that he had pressed a gate upon the abdomen of a sow in the last month of gestation, or near to litter or have her young, and while in that position, violently and repeatedly kicked the animal upon the belly, and caused the results or consequences above noticed.

But to return from this digression, I have to observe, that when the womb is distended by pregnancy, dropsy, tympanites, and is above the pubis (see *plates 9, 10*), it may be ruptured by forcible pressure or violent concussion, or it may be wounded with a sabre, knife, bullet from a gun or pistol; but when in the ordinary or unimpregnated state, it is so low in the pelvis that it cannot be wounded through the abdomen, unless the cutting instrument is passed obliquely through the pelvis, which rarely happens.

I have already described the danger of abdominal hysterotomy, called the Cæsarian operation (see p. 270), and shall here add a few other illustrations of the danger of penetrating wounds of the uterus during pregnancy.

The wife of a soldier, who was in the eighth month of pregnancy, received a sabre wound near the umbilicus, which pierced the fundus uteri, and wounded the foetus in the chest. She died in a few minutes after the injury; there was a great effusion of blood into the abdomen and womb. The infant was dead (Devaux). In another case, the abdomen was pierced during the seventh month of pregnancy, within three inches of the left side of the navel; blood mixed with water escaped from the wound, the abdomen collapsed, the uterus contracted, and on the next day the woman was seized with convulsions, hiccup, and bilious vomiting, and death occurred at the lapse of sixty hours after the injury. The puncture in the uterus was narrow, and two inches below that in the abdominal parietes, and the infant was wounded in the lower part of the shoulder (Planchon). In a third case, an unfortunate girl, the creature of seduction, anxious to induce abortion, introduced a sharp instrument through the vagina, and plunged it several times through the parietes of the neck of the womb, so as to pierce the membrane and destroy the foetus. Profuse hemorrhage ensued, which was followed by high fever, convulsions, and death.

The abdomen, uterus, and foetus, have likewise been pierced with a trocar in tapping, to relieve ascites, or abdominal dropsy, during pregnancy, as I have already noticed in a former page. Mr. Simmons witnessed a case similar to the latter, of a woman who was pregnant and dropsical, in which the uterus was wounded, and yet the pregnancy proceeded to its full period.—*Medical Facts and Observations*, vol. 8.

Musket and pistol balls have passed through the womb, killing both mother and infant; but some of the women survived, and recovered, in a very few instances.

History records the most convincing proofs of the truth of this statement, even within the last half century, amongst civilized, as well as savage populations.

Longius relates a case, in which not only the abdomen and uterus were wounded with a knife, but even the head of the foetus, yet the woman recovered.

Nevertheless, I am thoroughly convinced by my own observation, and I believe it to be the received opinion that such penetrating wounds of the abdomen and womb, during pregnancy, and also of the foetus, are generally mortal, and always dangerous for several days after their infliction, indeed they prove fatal in a large number of instances. It is important to bear this conclusion in mind, in giving evidence in criminal courts.

The *treatment* in contusions and wounds of the abdomen and womb during pregnancy, consists in the use of antiphlogistic remedies, as general and local bleeding, warm fomentations, baths, and all other means calculated to prevent or remove abdominal and uterine inflammation, as already described in pages 329, 333, as well as for the prevention of abortion, (see p. 310.)

It is, however, well known to experienced obstetricians, that pregnant women very often receive contusions by falls, blows, &c., on the abdomen, and do not suffer from inflammation, though premature delivery, and a dead infant, may be the consequences.

In addition to the diseases of the uterus now described, I have already noticed many others in these pages, as rupture, acute and chronic inflammation, uterine phlebitis, (see pp. 289, 329, 330.) Changes of situation of the womb, as retroversion, (p. 294), anteversion, (p. 295), obliquities, (p. 295), anteflexion, retroflexion, inversion, (p. 296), hydrometra or dropsy, and hydrorrhœa, (p. 297), hydramnios, (p. 298), phytometra, or discharge of gas, tympanites, (p. 301), uterine hæmorrhage, and abortion (p. 306), spasm of the womb, (pp. 314, 318), inertia, or atony of, (p. 315), the puerperal diseases including fevers, inflammations, &c., (pp. 326, 336,) the diseases relative to menstruation, puberty, the middle and climacteric periods of life, (pp. 337, 346). The diseases of the external genitals, have also been fully noticed, see pp. 351, 371), and a few only of the uterus and ovaries remain for consideration.

Prolapsus Uteri, Relaxation, Falling Down, Precipitation, Descent of the Womb.—These terms are applied to the descent of the womb from its natural situation, more or less, into the vagina, or through the vulva, when the disease is called *procidencia uteri*. I have already described the relative situation of the uterus to the vagina, and other organs in the pelvis, (see pp. 48, 57); and also delineated the natural positions of all these parts in *plates 3, 4, 12, 13*, to which I refer my readers, before perusing the following remarks, which will be otherwise understood with some difficulty.

Prolapsus, or descent of the womb, is divided into two species, by most British and foreign obstetricians: 1. when the womb either partially or totally descends into the vagina, is lower than natural, or rests upon the internal surface of the perineum, Burns, Hamilton, Sir C. M. Clarke, Blundell, Merriman, Gardien, Capuron, Hatin, Velpeau, Dewees, &c., &c., and this is termed relaxation, or incipient prolapsus, by Mme. Boivin, and M. Duges. 2. Procidencia, or complete descent of the womb, through the vulva, and hanging between the inferior extremities.

M. Kulm proposes another species, which he terms delapsus or semi-prolapsus, in which the orifice of the womb descends as far as the external genital aperture, when the uterus is in the axis of the outlet of the pelvis, or centre of the vagina, (see *plate 2, fig. 1. ff.*) This I consider a distinction without a difference, as any descent of the womb, however slight or great will be accompanied by the same train of symptoms, necessarily more or less aggravated, according to the malposition of the organ, and all to be removed by replacement and retention of the uterus in its natural situation, by the means which will be described hereafter. Every one acquainted with the structure of the human body, and more especially of the pelvic organs, must be aware that disorder of function by change of position, or by change of structure, must not only derange the whole from being supplied by the same nerves, but those adjoining, and even those remotely situated as every part of the body is connected by nerves, and particularly adjacent organs. It is

on this account, that slight relaxation, incomplete or complete descent of the womb, is accompanied by the same symptoms, in a more or less degree, and may derange every part of the body.

Prolapsus or descent of the womb, may occur at any period of life, when the organ is empty, as in childhood, the puberous and unimpregnated states, during pregnancy, even from the second to sixth month, and at any time after parturition or delivery.

The descent of the womb is termed *incomplete*, when it does not extend beyond the vulva, or external genital aperture; and *complete* when it escapes beyond the latter. The disease is rarely observed in children, but Monro recorded a case, in which an infant of three years old suffered from a complete prolapsus uteri. See his works 1782, and *Edinburgh Medical Essays*, vol. iii. p. 282.

The causes are relaxation of the round and utero-sacral ligaments, which support the uterus in its ordinary position, arising from natural weakness, and violent and repeated distention during the ascent of the womb, and in parturition. The round ligaments are greatly distended by the ascent of the womb as pregnancy advances, and the utero-sacral when the cervix uteri is enlarged, and forced down into the cavity of the pelvis by the infantine head in the first stage of labour.

The vagina is also greatly dilated to admit the passage of the infant, so that the relaxation of this passage and that of the uterine ligaments induced by repeated deliveries, together with the increased weight of the uterus after parturition compared to that in the ordinary state, are the chief causes of descent of the latter organ. It is for this reason, that a woman should not sit up, or assume the semi-erect posture, for several days after delivery, (*vide ante*, p. 185), as the weight of the womb will cause it to descend into the pelvis, as it has no support in the erect or sitting position from relaxed ligaments and vagina. Falling down of the womb is extremely common to women in humble class of life, who generally sit up too soon after delivery, often in an hour or two after the birth of the infant, and I have traced the disease to this cause in numerous instances.

The predisposing causes are a lymphatic temperament, laxity of fibre, leucorrhœa, repeated pregnancies, a large pelvis, the developement of tumours in the abdomen, tight lacing, every movement which requires strong contraction of the abdominal muscles, as vomiting, straining in evacuating the bowels, as in cases of obstinate costiveness, coughing, laughing, sneezing, and all efforts of respiration in which the abdominal viscera are forced into the pelvis, (see *plate 3, fig. 2*).

The slight resistance afforded by the relaxed ligaments and vagina to the weight of the uterus, is readily overcome by strong muscular exertion, as in jumping, falling, dancing, &c., and especially after parturition, when the womb is much heavier for several days than in ordinary state of vacuity.

It is also to be recollected, that the womb is habitually lower in the first months of pregnancy, and causes many of the symptoms of prolapsus enumerated hereafter.

The womb has been pulled down by midwives while extracting the foetus or placenta, and even torn from the body. (*Vide ante*, p. 184).

The pressure of the abdominal viscera on this organ in corpulent women, of varicose and other tumours, and of fluid in dropsies, often causes prolapsus.

The disease may come on suddenly or slowly, and when it occurs instantaneously, the partial extension or absolute rupture of the ligaments is followed by acute pain in the lower part of the abdomen, region of the sacrum, loins, and groins. It rarely occurs to young persons, whose organs are firm, but there are exceptions in those of lax fibre, who suffer from leucorrhœa and general debility, as observed by Mauriceau, Degraaf, Monro, and others, who describe cases of girls and unmarried women. Congenital shortness of the vagina is also a cause of the disease; nevertheless I have found in a vast number of vaginal examinations, the remark of Dr. Denman correct, that the orifice of the uterus in most women will be found within two inches and a half or three inches of the external genital aperture, and there is no inconvenience, no sense of bearing down, no pain in the loins, or other symptom of prolapsus.

It is, however, important to bear in mind, the length of the vagina in its natural state, and also its relation to vicinal organs, more especially when foreign substances called pessaries, which are of various sizes and forms, are to be introduced, and most improperly allowed to remain in it for months or years, except being occasionally withdrawn for the purpose of cleanliness, as these when too large do great injury, and may produce fatal diseases (see p. 362). I have already described this part, see p. 55, and *plate 3*, to which I refer the reader.

Symptoms.—The woman complains of pains, or a sense of dragging, in the loins, thighs, hips, and of a weight in the vagina, which also presses on the rectum or lower bowel, and causes a sensation of a substance dilating the genital organs, and forcing itself through them; and all these symptoms are most urgent, and increased by the efforts made in walking, standing, or while evacuating the bladder or intestines. There is generally indigestion, which is considered a primary affection, though symptomatic of prolapsus, and a variety of remedies employed for its removal in vain, while the disease which induced it is generally overlooked, especially by those unacquainted with obstetric medicine. I have known many cases of this kind treated with tonics for months, and some for years, which arose from the falling down of the womb, and when this disease was relieved, the indigestion very speedily disappeared. During an experience of twenty years as a constant observer at, or physician to, public charities, I have found that a large proportion of married women suffering from indigestion alone, or combined with hysteria, or lowness of spirits, also laboured under descent or prolapsus of the womb, or some other disease of the pelvic organs which induced the former; and I am fully convinced, even at present, that due attention is not paid to the diseases peculiar to women, in consequence of most of our medical colleges and corporations most unwisely and unwarrantably, in my opinion, not examining every one of their candidates in obstetric medicine. I have elsewhere shewn the evils of this omission. (*Manual of Medical Jurisprudence.*)

When the womb descends into the vagina, it is readily discovered, as an oval or pyriform tumour, having a transverse slit, easily raised with

the finger, and when this is withdrawn it again descends. In some chronic cases, it becomes adherent to the adjacent parts, and cannot be elevated, but it is loose in most instances, more especially in young persons, and when the disease is of short duration. In some examples the uterine orifice presents at the vulva and can be readily detected.

In all these cases the patient complains of pains in the loins, hips, &c. as above enumerated, which are increased by standing or walking, as well as stooping, as in washing, and are diminished by reclining in the horizontal position or lying on the back, when the pressure of the abdominal viscera will be removed, and the womb will fall back into its ordinary position, or if not, while the abdominal viscera will rest on the inner surface of the back, against the sacrum, when all pain and sense of bearing down will cease, as the dorsal, lumbar and sacral nerves will be no longer on the stretch.

When the uterus passes through the vulva, and hangs between the inferior extremities, it drags down the vagina in the form of a kind of hood. The pelvic viscera and bladder are envolved with the vagina in the cul-de-sac, and are also drawn downwards, so that the urine and fæces are evacuated with difficulty, the pains in the loins, groins, hips, thighs, bladder, and rectum, being greatly increased. The bladder in such cases is drawn backwards, and discharges its contents imperfectly and with difficulty, and the handle of the catheter must be elevated, so that its point will be turned downwards and backwards. There will be great pain, and frequent desire to void the urine as well as the contents of the rectum.

The length of the tumour will vary from six to ten inches, it may be globular, oval, or conical, strangulated or inflamed at its origin or neck, completely filling the vulva with the labia on its sides; it may ulcerate or become gangrenous, in consequence of its external position, and the frequent discharge of the urine and fæces over its surface, as well as the friction of the limbs to which it is exposed in walking. When the womb remains for a long time hanging between the limbs, its external surface may assume the appearance of skin. At the inferior part of the tumour, the orifice of the uterus will be found often narrowed, rounded, or semi-lunar, generally discharging mucus, and also the menstrual fluid. There is sometimes a purulent discharge from the surface of the uterine tumour, which is often inflamed, ulcerated, encrusted, and sometimes even gangrened.

Dr. Elmer mentions a case of partial procidentia, in which a small portion of the womb had escaped through the vulva and became gangrenous. In two years afterwards there was complete procidentia or prolapsus, as he terms it, from the woman having travelled in a cart; the remaining part of the uterus swelled and sphacelated in a few days, and the patient speedily recovered.

M. Rousset records three similar cases; in one the uterus had been gradually destroyed by gangrene, and there was no trace of it on dissection.

In some cases, the orifice of the womb may be so closed by displacement, by the vagina, or by such a confusion of parts as to prevent

impregnation, but this usually happens in cases of long standing, in which inflammation or adhesion occurs.

Dr. Baillie describes such adhesions in his very valuable work on Morbid Anatomy; and I have met with a few remarkable instances.

Women advanced in life, who have had several children, are often liable to procidentia uteri, or descent of the womb through the external genital aperture. I attended a lady, forty-eight years of age, the mother of fourteen children, whose uterus hung between the lower extremities, somewhat similar in form to an inflated calf's bladder, the smaller end being lowest. In another case, the tumour was much larger, no pessary to be purchased could retain it in the pelvis, and I was obliged to have one made for the purpose, nearly as large as the head of a new-born infant of small size. This woman was sent to me by a medical friend, at Edgware. In both cases the greatest relief was afforded by the use of proper instruments, gradually reduced in size, the vagina being injected every night with astringent lotions, in the manner hereafter described.

I must again repeat, that if pessaries are allowed to remain in the vagina for months or years in cases of aged persons, for example, over fifty years, which is too often the case, irritation, inflammation, suppuration, ulceration, or gangrene will be induced, (see cases in pp. 362, 363, 376).

I have endeavoured to give a minute account of the pathology or nature of prolapsus uteri or falling down of the womb, in the preceding pages, as it is, in general, considered too slightly, and a vast deal of suffering allowed to exist for a long time, which might be speedily removed. There is, however, much to be observed upon the means of treatment, and these I shall now proceed to consider.

Treatment.—The chief indications of treatment are to replace the womb in its natural position and to keep it so; and to improve the general health. When called to, or consulted by a woman who labours under symptoms of prolapsus or falling down of the womb, the medical practitioner should institute a vaginal examination as soon as possible, and always in the presence of a second woman, if one can be found, and he can always have one of his own domestics present when the patient is unaccompanied by a female friend. On passing one or two fingers into the vagina, the womb will be felt lower than usual, and can be readily pushed upwards into its ordinary situation. The size and capacity of the vagina can also be ascertained, which will enable the practitioner to determine upon the size of the pessary or sponge.

I must here observe, that sponges cause more irritation than pessaries, and are now, therefore, seldom employed.

Pessaries are made of different substances and are of different forms; some are made of wood, gum elastic, cork, ivory, silver or gold; but those most preferred at present are the wood, gum elastic, and ivory, and the metallic are not used as they are liable to rust by the constant application of the vaginal mucus, and to become incrustated with calcareous deposit. Pessaries are of different forms, some are round, oval, flat, others like a cup and ball, and some oblong; and of late M. J.

Cloquet, the celebrated anatomist, has constructed one of the exact form of the vagina, which he has designated *elytroid*, which he considers preferable to all others, but this, I shall clearly prove, is the most objectionable of any form in use, as will appear hereafter.

It is difficult to determine the superiority of one pessary over another, as cases occur in which one form will be more suitable than another; but in this country, the oval or round box wood pessary, or the flat gum elastic is generally preferred to all others. The oblong instrument, or that formed as a cup and ball, is scarcely ever used in this country, as its presence invariably leads, however cautious the wearer may be, to much irritation, and if the woman sits or falls down suddenly it will contuse the womb, bladder, or rectum, and induce pain or inflammation in any part that may be bruised. This objection particularly applies to the elytroid form of M. Cloquet, which to fill the vagina should be from three to six inches in length, and from four to six in circumference in most cases, but in many very much larger, when the vagina is much relaxed, as in aged women; so that such a substance placed in the vagina and left there constantly, would expose it as well as the womb, perineum, and bladder to contusion whenever the woman sat down suddenly, or made any kind of violent exertion.

In proof of this opinion, I may mention, that the late revered Professor Hamilton, of Edinburgh, was accustomed to describe a case in his admirable lectures on obstetricy, in which an oblong wooden pessary, between three and four inches in length, had been worn for some time, but one day the lady threw herself suddenly into an arm chair, when she instantly experienced acute pain in the womb, which was suddenly followed by inflammation, and it was with great difficulty that her life was saved.

When the pathology of descent of the womb is considered, viz. the relaxation of the sacro-uterine and round ligaments and vagina, increased by the pressure of the abdominal muscles and diaphragm, it must be obvious that the introduction of a pessary, a piece of sponge or cork into the vagina, to support the womb and to prevent it from escaping through the vulva, is only a temporary remedy; and although it affords much relief, cannot be expected to effect a permanent cure. It cannot restore the tone of the relaxed parts, which is best accomplished by improving the general health, preventing the womb from descending, which the instrument will do if properly applied, and by withdrawing it every night at bed time, and injecting the vagina with some astringent lotion as used in leucorrhœa, (see p. 349), so as to contract that canal, and render it capable of receiving a pessary of smaller size. The patient should also be in the recumbent posture as much as possible. Indeed the pessary requires to be worn for years, and sometimes during life, and this has led to the invention of another instrument, the utero-abdominal supporter, which I shall notice immediately.

Application of Pessaries.—The woman should be placed on her left side, and two fingers of the right hand passed into the vagina, to ascertain the exact position of the womb and surrounding parts. This examination is advised by some to be made in the erect or sitting

posture, the patient being placed in a reclined position in an arm-chair (see p. 161, and *plate 15, fig. 3*).

As soon as the relative position of the womb to the surrounding parts is ascertained, the obstetrician should separate the external labia with the fingers of the left hand, and with those of the right introduce one end of the pessary into the vagina, the instrument being first smeared over with pomatum, fresh butter, lard or oil, and then turned transversely or horizontally, so that its largest diameter may be from one side of the pelvis to the other or from hip to hip, and the small diameter from pubis to sacrum. There should be a hole or holes in the end or in the centre of the instrument to admit the escape of the menses and uterine mucus, and a piece of strong tape should be passed through this aperture, so as to enable the woman or the obstetrician to withdraw the pessary from time to time. The instrument should always be introduced and withdrawn in the natural curve of the vagina, (see *plate 3*), and there is often much difficulty in passing or removing it in any other direction.

There is occasionally some difficulty in passing a proper sized instrument, as the constrictor vaginæ contracts the vulva so much when any substance is being introduced, as to impede its progress; and this will often happen when the canal of the vagina is very much dilated, and requires an instrument of a large size. This difficulty is to be overcome by cautious, steady, and gradual pressure, as whenever violence is used, inflammation and the consequences which usually follow it, may be induced. If the pessary or foreign substance be too large, it will compress, contuse, and inflame the parts to which it is applied, and may also very much impede the evacuation of the bladder and intestines.

But when the pessary is of proper size and judiciously introduced, so far from causing pain, it will afford instant relief, and at once remove all the bearing down, and various pains already described as the symptoms of prolapsus uteri.

If the patient make this declaration immediately after the introduction of the instrument, and while in the lying posture, on her side, on a bed or sofa, she may then rise, and walk about, or cough, and if she suffer no pain, the instrument is properly applied. She should now put on a doublet or napkin as during menstruation, and apply this rather tightly at first, especially when the vagina and vulva are much relaxed.

I have often been highly gratified on hearing, after having passed a pessary, that all the pain was gone, and that the woman felt more comfort than for several years past. The patient is to be informed, that to remove the instrument, she has only to pull the tape attached to it, and which hangs through the vulva, through the centre of that aperture, when she can readily withdraw it, wash and oil it, then inject the vagina, and re-introduce the instrument. The tape, however strong, must be frequently changed, or it will become softened by the vaginal mucus, and easily torn, and in such case there will be an utter impossibility of withdrawing the instrument on the part of the patient, and often on the part of the obstetrician, unless scientific, when he can always remove the instrument in the axis of the vagina, or outlet of the pelvis, in the manner already mentioned, (see p. 362.)

When the pessary is applied, the woman should stand up, walk a few paces, and cough, which will enable the obstetrician to determine whether the instrument is properly adjusted or not, as it may fall out if too small, or cause pain, if too large.

The presence of a pessary always causes, at first, more or less irritation in the vagina, an increased discharge of mucosity, inflammation, and sometimes a difficulty of evacuating the bladder or bowels. In such case, repose in the lying posture will diminish the pressure of the abdominal viscera, and descent of the womb, while baths, emollient vaginal or rectal injections will be advantageous.

After a short time, the vagina becomes habituated to the instrument, and the symptoms above described no longer recur.

In other cases, the instrument must be withdrawn, and a smaller one applied; and in some the woman cannot bear the instrument at all, and then the womb must be supported with a sponge, gum elastic bottle, or oiled lint, passed into the vagina.

In all cases the pessary should be withdrawn every night at bed-time, and the vagina injected with an astringent lotion, (see pp. 348, 350), and this withdrawal is particularly necessary in conjugal life; and in other cases every third or fourth day. When the instrument remains too long in the vagina, it becomes altered, corroded, softened, or covered with a calcareous incrustation, which may cause inflammation, ulceration, vegetations or excrescences, or may induce vesico-vaginal, or recto-vaginal fistula. It is, therefore manifest, that it is highly improper to leave pessaries in the vagina for months or years, without once removing them, which is, I grieve to indite it, too often the practice.

Every time the instrument is withdrawn, it should be steeped, and washed in warm water, then dried, oiled, and re-introduced.

When the uterus descends during the early months of pregnancy, it should be replaced, and a pessary worn as above described, until the sixth or seventh month, when the enlarged womb will ascend into the abdomen, and rest upon the iliac fossæ or inner surface of the hip bones, and will no longer need artificial support.

But when the womb in the pregnant state, passes through the external genital aperture during the first six months, it should be replaced, and supported in the manner mentioned—the patient assuming the horizontal or lying posture as much as possible. I may here state that I have had three cases of this kind under my care during the last five years, all were relieved, and all the women safely delivered at the full time.

In some very rare cases, the womb passes through the vulva, and cannot be returned, in consequence of adhesions, or of its size, and then it should be supported by a proper bandage, and the woman remain in the lying posture until the time of delivery.

The following singular examples described by living witnesses are worthy of record, and attentive consideration, while the respectability of the reporters is a sufficient guarantee for their authenticity. The illustrious Harvey, recorded a case similar to Baron Richerand's, in his work on Generation already quoted.

Baron Richerand describes the following very remarkable case in his

Nosographie Chirurgicale. A peasant girl aged fourteen years, made a violent effort during menstruation, which precipitated the womb externally; it was not reduced, and she insensibly became accustomed to its inconvenience until the age of twenty-two years, when she married. Her husband, a person of great simplicity, supposed his wife to be formed like other women, and he tried in vain for twenty-one years that she might become a mother. She enjoyed excellent health, menstruated regularly, and bore the fatigues of severe agricultural labour.

At length her husband succeeded in dilating the mouth of the womb, into which he introduced the glans penis and consummated the act of generation. The woman became pregnant, the foetus and womb gradually developed, and the period of parturition arrived. The labour pains were regular, but insufficient to expel the foetus, as they were very imperfectly assisted by the action of the abdominal muscles, the pressure of the viscera, and more especially, as the neck of the womb and the sides of its mouth, or orifice, had acquired a cartilaginous hardness: the contractions of the uterus or labour pains, at length became ineffective. M. Marrigues, of Versailles, was consulted, he found that the womb was external to the vulva, formed a tumour the size of a very large melon, whose parietes were very hard, and its orifice, which was placed inferiorly, was about an inch in diameter. A double incision was made to enlarge it, the labour terminated favorably, a full grown dead infant was born, and at the end of two months the woman had perfectly recovered.

Dr. Ashwell kindly favoured me with the following particulars while preparing these pages, (June 1840.)—"The patient consulted me for *complete procidentia*, which was irremediable. When I told her thus much, she remarked, that she was not surprised, as during the whole of her last pregnancy, the uterus was external, and continued so up to the period of parturition. She referred me for corroboration of these facts to a medical man at Greenwich, who had preserved the notes of the delivery. I had intended to apply to him, but I believe, owing to numerous daily engagements, I did not do so."

Mr. Kingdon has also lately favoured me with the following account of an interesting case, (June 1840.) He was requested by a general practitioner to visit a woman in labour on whom it was supposed gas-trotomy should be performed, in consequence of extra-uterine pregnancy. The woman stated that the cervix uteri had been external to the vulva for two or three years, and had never returned, and that her husband had connexion with her through it.

On making a vaginal examination, the finger passed readily into the mouth and neck of the womb, and left no doubt of their external position.

The infant was very active, and its form was easily traced through, what Mr. Kingdon considered, the abdominal parietes. He requested Dr. Blundell, who was then engaged in his valuable experiments on abdominal surgery, to see the patient, and the Doctor agreed as to the nature of the case, but found the uterine orifice somewhat drawn up by the labour pains, within the vulva. He also distinctly felt the infant's head. The labour, though tedious, was not violent, yet the woman gradually sunk and died.

On examination after death, "I found," says Mr. Kingdon, "that only about two-thirds of the body of the womb had dilated to contain the fœtus, the parietes of which portion were not much thicker than brown paper. The lower third of the body passed funnel-shaped to the cervix, which was much elongated, with its sides softened and thickened, and sufficiently patent for the purpose, which it had for a long time served."

When there is complete prolapsus or procidentia uteri, or descent of the womb externally, the organ will hang between the lower limbs covered by the vagina, which is turned inside out, and which not only contains the uterus and its appendages, (see *plate 4, fig. 1,*) but also the bladder; part of the rectum, and some portion of the intestine, (see *plate 3, fig. 2.*) Cases of this kind have been completely attested by Kerkring, Saviard, Madame Boivin, and Professor Duges, and many others, as well as the distinguished members of the profession just mentioned.

If the reader will take the trouble to study the relative position of parts as delineated in *plates 3 and 4* of this work, as well as the appropriate descriptions, and their diseases, he can easily understand that the orifice, neck, and body of the womb, may partially or totally escape externally, and in the latter case draw down the tubes, ovaries, and uterine ligaments, as well as the bladder and rectum, graphical illustrations of which he will find in the valuable production of Madame Boivin, and M. Duges, translated by Dr. Heming.

In complete prolapsus, the uterus descends externally covered by the vagina, its orifice being inferiorly, while the bladder and rectum or lower bowel, is more or less drawn down, and its function deranged.

I need scarcely remind any one conversant with anatomy, that the convolutions or folds of the intestinal canal, will be behind the protruded organs, but I make the remark for the information of my junior readers. I have also to observe, that there is a great difference between complete prolapsus or descent of the womb, and inversion of that organ, which I may here briefly mention.

Inversion of the Womb.—When the womb is inverted, its fundus or upper part is forced through its orifice, as well as that of the vulva, and becomes the lowest part externally, the organ is literally turned inside out, the uterine orifice or mouth of the womb being superiorly, or towards the pubis, its lining or mucous membrane being externally, and its inverted cavity sometimes filled with some portion of the intestinal canal.

This disease may be caused by forcibly pulling the navel cord to remove the after-birth, or by violence inflicted by ignorant pretenders to obstetric knowledge, a deplorable case of which will be found in p. 184.

When the uterus is inverted, the mucous membrane which will be external, becomes inflamed, or ulcerated, and sometimes gangrenous in consequence of the friction in motion, and the pelvic discharges. I shall describe this disease more fully in a future section. I shall merely observe that in all cases of descent of the womb, whether partial or complete, the organ should be restored to its natural position, and kept there by the various contrivances suggested for the purpose.

Osiander proposed to introduce a linen bag filled with tan or tannin, steeped in wine, while others preferred wool, lint, old silk, &c.

When the displaced parts become enlarged, swollen and hard, and the disease of long standing, the reduction may be effected with difficulty, or be entirely impracticable.

It must be manifest from the preceding account of the nature and treatment of descent of the womb, that the chief indications of cure are to keep the organ in its proper situation, to prevent the pressure of the abdominal muscles and viscera upon it, and to improve the general health.

The ordinary means too often fail, and this has led Dr. A. G. Hull, of New York, to invent an instrument which he has called, utero-abdominal supporter, a very useful invention, but which, in my opinion, however valuable I admit it to be, cannot supersede the use of pessaries, which it greatly assists.

Dr. Hull's utero-abdominal supporter, consists of a large pad, which is placed between the hips, with springs to fit the hips comfortably, and cross the abdomen, with a pad to press upon the perineum, and a belt attached to the springs in the front of the abdomen.

It must be obvious to every one acquainted with the pathology of prolapsus uteri, that this instrument, however excellent and useful, does not, or cannot give proper support to the womb when it rests on the perineum, or approaches to the genital aperture; and consequently, though superior to, can by no means supersede the use of pessaries. In many cases both instruments must be employed at the same time, and will greatly assist each other, in their united beneficial results. This statement is so true, that pessaries and the utero-abdominal supporter, however useful in most cases, signally fail in some, in which a surgical operation must be performed.

I have been greatly surprised to observe the certificates of some eminent and experienced physicians and surgeons, but more especially of experienced obstetricians, both in America and this country, testifying the superior efficacy of the utero-abdominal supporter to pessaries, and to all other means for the cure of prolapsus uteri. It will appear, however, by the sequel, that this is an erroneous conclusion, and that no instrument can cure all cases of descent of the womb.

It was long known, that if the vagina was contracted by astringent injections used daily when the pessary was withdrawn, the size of that instrument might be gradually diminished, and a cure accomplished. If the same canal were contracted by inflammation the uterus would be kept in its proper situation. A case fell under the care of Dr. Holland, of Queen Street, Mayfair, in which a pessary caused great inflammation, which was succeeded by firm contraction of the vagina, and the uterus remained in its natural position ever afterwards.

The result of this case led Dr. Marshall Hall and Dr. Heming to the idea of diminishing the calibre of the vagina, by excising a portion of its parietes, and closing the edges of the wound by means of sutures. This operation had also been proposed by M. Girardin, and successfully performed in France by M. Berrard, but I cannot state whether before or afterwards.

Dr. Marshall Hall's case is so important, that I shall insert it as given by himself.

The patient was a poor woman who had suffered from complete prolapsus, with partial descent of the bladder and of the rectum, which formed a pouch posteriorly. The os uteri protruded two inches externally. "It occurred to me," observes the Doctor, "that if the canal of the vagina could be considerably, permanently, and firmly reduced in diameter, the uterus would be supported in its place, and prevented from resuming its prolapsed situation, and that this might be done by removing a portion of its mucous membrane along the anterior part, and by bringing and retaining the denuded surfaces in contact, by successive deep sutures, until they should unite by cicatrix."

The operation was performed by Mr. Heming, of Kentish Town. The uterus being protruded as much as possible by the patient, two parallel incisions were made through the mucous membrane, from the sides of the os uteri, along the course of the protruded vagina to the os externum; the portion of the membrane situated between these incisions was then removed, leaving a space of an inch and a half in breadth, and the entire length of the vagina completely denuded. A suture was then inserted near the os uteri; this suture being tightened, the os uteri was obviously pushed upwards. A second, a third, and other ligatures were then inserted in the same manner, at short intervals, to the os externum; each ligature on being tightened moving and supporting the os uteri upwards.

This operation was attended with little pain, the only sensitive parts of the membrane being those near the os uteri and os externum.

An opiate was given, and no pain followed. In four or five weeks the denuded parts had firmly united, and shortly afterwards the ligatures came away. In six, eight, and ten weeks the os uteri was felt *in situ*, by the finger passed through the vagina, the latter was firmly contracted in its extent, and the pouch of the rectum lessened. In two years after, (November, 1833), the cure remained perfect.

Hysterocele—Hernia of the Uterus.—The uterus may present at the inguinal or crural ring, both in its empty and gravid state, but very rarely in the former condition, and also escape through the abdomen. The disease is distinguished by its hardness, the obliquity of the vagina, the elevation of the uterine orifice, and its being opposite to the tumour, and also by the change of the hernia, when the woman turns on the abdomen or back.

In the early months of pregnancy, the uterus ascends and is heavier than in the unimpregnated state, and may present at the crural or inguinal ring, forming crural or inguinal hernia, or through the parietes of the abdomen, causing ventral hernia; such cases are, however, of very rare occurrence, but are described by eminent authors, and deserve a brief notice in these pages.

J. L. Petit describes a case of ventral hernia which suddenly occurred during severe labour, and extended from the pubis to the ensiform cartilage. The infant was hydrocephalic, craniotomy was performed, the extraction of the fœtus was accomplished without much difficulty, and the woman recovered. (*Œuvres Posthum.* tom. iii.)

Ruysch relates the case of a woman, who had had large abscesses near the pubis. When she became pregnant, and the abdomen distended, the cicatrices gave way, the womb protruded more and more daily, until at last it reached the knees. When labour came on, the womb was raised, and spontaneous delivery accomplished. (*Advers. dec. ij.*) The same displacement has occurred during pregnancy, after the Cæsarian operation.

Saxtorph records the case of a woman, aged forty-nine years, who in the fifth month of pregnancy, found that a tumour she had for some years near the inguinal region, increased as the womb enlarged in size; and it was discovered, that the uterus formed a part of this tumour. Parturition occurred spontaneously, and on passing the hand to extract the placenta, the unnatural position of the womb was clearly ascertained. The woman recovered, but the uterus still continued to project outside the abdomen. (*Bibl. Med. tom. 67*).

Crural Hernia.—Sennert and Doringius give autopsies of this disease, but a more recent case is recorded by M. Lallemand in 1816. (*Bull. de la Faculté de Med. tom. i*). The woman was aged eighty-two years, and had had the tumour for forty years in the right groin; it was of a pyramidal form, measured five inches in length, and four in width. The uterus, ovaries, tubes, and vagina were found behind Poupart's ligament.

Inguinal Hernia.—The authors named in the last paragraph have also described inguinal hernia. Lallemand found the uterus of a woman aged seventy-one years, enclosed with the right ovary and a portion of the vagina in a thick hernial sac, which had penetrated the right inguinal ring. It was pyramidal in form, and only two or three inches in length. (*Mem. Soc. Med. d'Emulation, troisième Année*).

Chopart describes a case very similar. In these cases, the tumours should be reduced if possible, or otherwise properly supported, but a cure is scarcely to be expected.

Immobility of the Uterus.—The uterus is moveable for the wisest purposes, to allow of enlargement during pregnancy, and not to press on adjacent organs, for if fixed, it would impede the functions of the bladder and rectum. But inflammation of the organs in the pelvis may induce adhesions between them and the uterus, so that the organ becomes fixed. If in such cases pregnancy occurs, the womb cannot ascend, the adhesions will be stretched, inflammation excited, there will be pains in the pelvis, lower extremities, nausea or vomiting, derangement of the bladder and rectum, which will be followed by abortion, and often by death. The records of several cases made by Madame Boivin and M. Duges, attest the existence of adhesions of the omentum and uterus, causing dragging of the stomach and colon, partial irritations, or peritonitis. Baudelocque describes a case in which the woman died in labour. The omentum was rolled up like a cord, adhered to the right anterior and lateral part of the uterus, so that the stomach and arch of the colon were considerably on the stretch. The woman had suffered much from vomitings, diarrhœa, and syncope.

Ruysch and Morgagni describe cases in which there were severe dragging sensations, and long continued derangement of the health.

Abortion occurs from the third to the fifth month in such cases, and usually proves fatal, unless the inflammation be subdued by mercury.

Anormal Productions of the Uterus.—The anormal productions of the womb are calculous concretions, hydatids, collections of fluid, and gases, and different tumours. They are solid, fluid, and aëriform or gaseous.

Calculous Productions, or Stones, have been found in the substance of the womb, and also in its cavity. It is supposed that they are formed like biliary and urinary calculi: but their causes are unknown, and they are rarely detected during life. It has been said, that they may be felt with the finger, or with a sound in some cases. They produce the same symptoms as prolapsus, polypus, and many other diseases of the uterus, which must be subdued by the usual remedies.

Bonet, Skenchius, Lieutaud, Louis, Roux, Amussat, and others, have recorded cases of calculi. Some of the stones were analyzed, and consisted of a large proportion of animal substance, combining the salts of soda, potash, and lime. Others contained phosphate of lime, and gelatine. The size and weight vary, the latter being from one to ten ounces.

The calculus may be expelled spontaneously, according to Louis, seized with a forceps, and the os uteri enlarged by incision, if necessary, but in one case mentioned in a journal of Turin, and cited by the *Rev. Med. T.* xiv., the os uteri was sufficiently open, the position of the calculus was changed, and the substance was then extracted by means of the fingers, forceps, and a common spoon.

When the calculus is too large to pass through the os uteri, and distinctly felt by means of the finger or sound, it might be seized with a curved forceps, and broken into fragments of smaller size, which might be readily extracted. If this could not be accomplished with the forceps alone, the percuteur of Baron Heurteloup might be employed, as in lithotripsy, to seize the calculus, and the external extremity struck with a hammer, so as to break up the stone if possible.

When all these means fail, and the powers of life are endangered, perhaps the stone ought to be extracted through an incision made above the pubis, and through the uterus; an operation, which I apprehend, few would be induced to attempt for the reasons already stated, (see p. 279).

M. Louis speaks of a case in which a calculus was extracted by incision of the uterus, but whether through the vagina or abdomen, he does not mention, indeed he admits that he was not informed of the details of the operation.

Hydatids of the Uterus.—Hydatids may exist in the substance or cavity of the uterus after, but not before, coition. They cause enlargement of the uterus and abdomen, and the woman is generally supposed to be pregnant. As the enlargement of the womb advances, many of the usual symptoms of pregnancy are present, the os uteri becomes enlarged, the uterus heavier than in the unimpregnated state, there is suppression of menstruation, nausea, vomiting, costiveness, and in some cases a secretion of a serous fluid in the breasts. I have known a lady affected with hydatids for eight years, during which, more than one medical attendant had declared that she was pregnant. She was seized with supposed labour pains on several occasions, during the first four years, and her

medical adviser declared, that she was about to give birth to an infant. He remained in close attendance on one occasion for four days and nights, when I was requested to see his patient. On due enquiry, and careful consideration of all the history of the case, it was my opinion, that the woman was not pregnant. This declaration was very annoying to the medical attendant, but very gratifying to the lady, as she had been four years separated from her husband, and as she had during the greater part of the time a large abdomen, as large as in the last months of pregnancy. The world gave her credit for having been repeatedly pregnant, and for having destroyed the infants.

I was not aware of this erroneous and scandalous gossip, when I gave my opinion, for the lady was a stranger to me, and I had not seen her before my visit.

I was aware that in cases of uterine hydatids apparent labour pains come on when they were about to be expelled; and these may cease and recur at different periods, from the ninth month to eight years, according to my own observation. Sooner or later, one or more hydatids escape, accompanied by more or less watery discharge, or more or less hæmorrhage.

The medical attendant was very much disconcerted at my opinion, and still maintained his own. He therefore continued in attendance for twenty-four hours longer, when all pain ceased, no infant was born, and nothing escaped from the womb. These facts I learned from the sister of the patient, who called upon me, to inform me of the result of the case, and the correctness of my opinion.

In four years afterwards I was summoned to visit the same lady, her former attendant having paid the last debt of nature. I was assured that there had been no decrease in the size of the abdomen since my former attendance.

The lady was now in apparent labour, the pains very severe, the skin hot, the pulse rapid, 126, the abdomen very painful on pressure, but soft and compressible, and not round and firm, as when a full grown infant is in the uterus. On making a vaginal examination, the os uteri was enlarged, and its lips thickened, but pressure on the abdomen with the other hand, made no impression on the fingers applied to the uterine orifice. These symptoms continued for forty-eight hours, when the uterus expelled nearly a wash-hand basinfull of hydatids, of different sizes, from that of a gooseberry to that of a hen's egg, some containing a transparent, others a dark coffee-coloured fluid. The pains now ceased in great measure, but as there was great tenderness of the abdomen, and perhaps more or less hysteritis and peritonitis; leeches, a blister, and mercurial action were employed, and convalescence established in about a fortnight.

Treatment.—It has been proposed to inject vinegar, or salt and water, and different bitter infusions into the uterus, but these are of little use. In cases in which a sac can be felt, it might be lacerated by passing a sharpened stylet, (see *plate 40, fig. 8,*) but this would only afford partial relief, as each hydatid is separate, or several may be attached to each other in bunches, while more are superimposed or placed over each other, or one within another, so that the rupture of one could not affect

the rest. If a catheter or sharpened stylet were introduced into the cavity of the womb, and turned round in different directions, it would break up all hydatids or sacs, with which it came in contact; but the diagnosis is so difficult, that few would venture to use the instrument in doubtful cases, which are the most common.

Hydrometra—Dropsy of the Womb.—This disease consists of an accumulation of serous, sero-mucous or albuminous fluid, in the cavity of the womb, when its neck is obliterated by adhesion, scirrhus, cartilage, or by tumours of different kinds, hydatids, &c. The sero-mucous fluid is generally mixed with pus, or blood, and is often of a yellow, or dark colour, though it may be transparent. It has occurred, and been discharged, in a case of cancer of the uterus. (Boivin, Duges.) The quantity of fluid varies considerably, from one to two pints, and may be so great as to distend the abdomen, as in the last months of pregnancy, and be mistaken for ascites.

Dr. A. T. Thomson describes a case, in which there were eight quarts of a dark brown fluid, which coagulated slightly when heated in a spoon over the flame of a candle, (*Medico Chirur. Trans.* v. xii. Part 1.)

Blanckard records a case in which eighty-five pints of ichorous, oily matter, were found in the uterus; and Vesale, another in which the fluid amounted to one-hundred-and-eighty pints.

When the uterine orifice is imperfectly closed, the fluid may partially escape. It has also been observed that the exhalation of the fluid may proceed from a limited surface of the uterus, only as lately recorded by Dr. Ashwell, in *Guy's Hospital Reports*.

He describes cases in which a considerable quantity of thin watery fluid was discharged from the uterus—a fact long established. But I cannot perceive how mucous membrane could secrete serum, as described by some few authors; and hence the propriety of the term serous fluid, in the above definition remains to be proved. Moreover, in the remarkable cases I have quoted, the fluid was thick, and of a yellow or dark colour, and not called serum by any of the observers.

The causes of uterine dropsy are not easily determined, as it accompanies many organic changes in the womb; but is generally preceded by acute or chronic inflammation. It only occurs to married women of delicate constitution, and may exist during pregnancy.

Symptoms.—The size of the abdomen increases slowly, or rapidly, and during the first months the woman often supposes herself pregnant, and some of the signs are present as in other diseases of the womb, although in its empty state. It is, however, easy to distinguish hydrometra from ascites, and ovarian dropsy, after the ninth month. In hydrometra, the abdomen is uniformly round, and the tumour occupies the hypogastrium, the fluctuation is obscure and circumscribed. The patient experiences a sense of weight on the perineum, pains in the loins, and twitching in the groins, and inferior extremities.

The most certain sign is afforded by the touch, or vagino-uterine examination, by passing two fingers into the vagina, and percussing the uterus above the pubis with the fingers of the other hand, when fluctuation will be distinctly felt, and the womb distended, which will not exist in ascites, ovarian or tubal dropsy; in all of which, the body of the

uterus will not be expanded, but pressed downwards and backwards, or to the left or right side, without any increase in its size.

The history of the case and a due estimation of the signs of pregnancy, (see p. 150), will in general lead to a correct diagnosis. The absence of resonance on percussion, and the presence of fluctuation will distinguish uterine dropsy from tympanites.

I may here offer a practical hint of much value in exploring the abdomen in doubtful cases of dropsy, or pregnancy, which has often enabled me to detect fluctuation by means of the fingers alone, when others had failed to do so by the usual method. Let the left thumb be placed an inch below the umbilicus, and the four fingers of the same hand be widely separated from each other, and moderately pressed on the right side of the abdomen. Let the opposite side of the abdomen be smartly percussed with the tips of the fingers of the right hand in the umbilical and hypogastric regions; and a distinct sense of fluctuation, if any fluid exist, will be clearly perceived, in a great majority of instances. The same process should be employed on the other side of the abdomen with the other hand. But when the tips of the fingers are applied to the side of the abdomen, and the other percussed, or smartly tapped with the fingers of the other hand, which is the usual method, a sense of fluctuation will not be perceived; although the presence of fluid will be very distinctly perceptible by the former method.

The duration of dropsy of the womb is very variable; sometimes the fluid is spontaneously evacuated at the third, sixth, or ninth month; at other times it remains for years, during which the patient may bear offspring.

When hydrometra is caused by organic diseases of the womb, it is generally incurable; but when the organ is not much affected, a complete cure may be expected, in young and middle aged women.

On examination after death the womb is found thinned, and its internal surface covered with polypous excrescences or hydatids; and it is sometimes ulcerated or gangrenous.

Treatment.—When the womb is free from organic disease and pregnancy, it has been proposed to employ purgatives, emetics, irritant clysters, and injections, with a view of dilating the uterine orifice, which may also be accomplished in some cases with a finger or a gum elastic catheter, a sound or armed stylet. When the os uteri is dilated, by whatever means, it should be kept open with gradually enlarged wax or elastic bougies, or a piece of sponge, while baths, and emollient fumigations and injections, may be directed through the vagina to the cavity of the uterus, to prevent a return of the disease. But as dropsy of the womb may be confounded with pregnancy, great care should be taken in using any means of dilating the os uteri or rupturing the membrane. But all these means may fail in some cases, and the os uteri be perfectly and solidly closed. In a case of this kind, of a woman aged fifty-three years, a puncture was made above the pubis, and fifty-three pints of thick, black, sanguineous fluid evacuated. There was no appearance of a relapse ten months afterwards. (*Wirer, Ann. Lit Med. Etrang, T. ii.*)

Cruveilhier records another case in which the puncture was made in the cervix at the upper part of the vagina, which was considered pre-

ferable to that of the body of the uterus, but it was followed by a fatal result. (*Anat. Pathol.* tom. 1). I have already stated, that penetrating or lacerated wounds of the uterus, either through the abdomen or vagina, are highly dangerous and generally mortal, (see pp. 277—279, 372, 373).

When the fluid is evacuated, every means should be resorted to for the improvement and restoration of the general health, and these will be found enumerated in pp. 339, 348.

Lastly, there are other forms of uterine dropsy, which occur during pregnancy, and which have been termed hydrorrhœa and spurious waters (see p. 297); redundance of the fluid of the amnios or hydramnios (see p. 298), which I have already described. I refer to them in this place to render the account of dropsies of the womb perfect, and to avoid repetition. I shall observe in conclusion, that many of the older, and indeed some few of the modern obstetric professors and authors, seem disposed to deny the possibility of dropsy of the womb, on account of the superior and inferior uterine apertures, which would allow any fluid in the womb to escape; but they forgot that these openings might be completely obliterated by adhesion or inflammation, and they could not have been acquainted with the records of the cases above noticed.

Hematometra—Hematopsia—Effusion of Blood into the Womb.—When the orifice of the vagina or uterus is either partially or totally obliterated, there may be an effusion of blood into the uterine cavity, so considerable, as to simulate pregnancy at the full period, and endanger the life of the woman. M. Hatin describes the case of a young woman, over twenty years of age, which he observed at the Hotel Dieu, in Paris, whose uterus was very much distended with blood, which led several physicians to declare that pregnancy existed. It was found, on examination of the genital organs, that a membrane closed the vagina, it was divided by a crucial incision, a large quantity of blood escaped, and all symptoms of pregnancy disappeared.

The diagnosis is easily formed in such cases, as the development of the womb is more rapid than in pregnancy, the tumour is uniformly distended, is soft and insensible, and is increased in size at each menstrual period, though stationary during the intervals, and all the positive signs of pregnancy are absent, (see p. 156).

I am disposed to think that the fluid in the above case was menstrual, and not sanguineous, more especially as most foreign authors use these terms synonymously, although the fluids are totally different, the one being a secretion, the other the vital fluid. (See pp. 65, 70).

I need scarcely observe, that in dividing any membrane or solid growth which may fill up the vagina, very great care should be taken in making the incision, not to wound the bladder or rectum. The part should be kept dilated by the same means as in the after treatment of hydrometra, as stated in the preceding section.

Physometra—Pneumatosis Uterina—Tympanites Uterinus—Uterine Tympanites.—The term tympanites is applied to the distension of the intestines, both large or small, and abdomen, with air or gases of different kinds, and also of the uterus, the affected part giving the sound of a drum on percussion, hence the popular term, drum-belly, applied to the

disease. The illustrious John Hunter was of opinion, that air, or the gases were secreted like other fluids, and this is now universally admitted. Magendie and Gerardin subsequently removed all matters containing air or the gases from a portion of intestine, and then included it between two ligatures, nevertheless gas was detected in the part experimented on.

Professor Wiimot, of Dublin, was wont to relate a case of supposed psoas abscess in his valuable lectures, which he opened by the plan of Mr. Abernethy, a gush of air only escaped.

The Hunterian opinion, that air, or rather gases, may be secreted in different parts of the body, is now universally received.

It is still more obvious, that air may be swallowed with the food, or generated in the stomach and bowels by certain vegetable aliments, and the celebrated Dr. Hales long since maintained, that an apple, as well as many other kinds of vegetable foods, may form during fermentation, six hundred times their size of elastic air or gases.

It is also well known to scientific and experienced physicians, that there may be a sudden and excessive secretion of gases in hysteria and dyspepsia soon after taking aliment, and likewise in a few hours or days after parturition.

M. Chevreul analyzed the gases in the stomach and intestines, and obtained the following results:—

1. In the stomach; oxygen, 11; carbonic acid, 14; hydrogen, 3·55; nitrogen, 71·45=100·0.

2. In the small intestines of three different subjects; oxygen, 0·0; carbonic acid, 24·39; 40·0·25·0; hydrogen, 55·53; 51·15; 8·4.=100.

Nitrogen, 20·0·8; 8·55; 66·6=i. 100, ii. 100, iii. 100.—*Mem. Roy. Med. Soc.* tom. x. p. 72.

Gases in the same three subjects in the large intestines:—

1. Oxygen, 0·0; carbonic acid, 43·5; carburetted hydrogen, with a trace of sulphuretted ditto, 5·47; nitrogen, 51·03=100·00.

2. Oxygen, 0·0; carbonic acid, 70·0; hydrogen, and carburetted ditto, 11·6; nitrogen, 18·4=100·0.

Gases in the cæcum of the third subject: oxygen, 0·0; carbonic acid, 12·5; hydrogen, 7·5; carburetted hydrogen, 12·5; nitrogen, 67·5=100·0.

Gases in the rectum of the same subject:—oxygen, 0·0; carbonic acid, 42·86; hydrogen, 0·0; carburetted hydrogen, 11·18; nitrogen, 45·96=100·00.

These results are given by M. Magendie in his *Physiology*, tom. ii.; Dr. Bostock's *Phys.* v. ii.; but it must be manifest, that as derived from a few cases, however satisfactory, they are wholly inconclusive as regards age, sex, diseases, &c. In proof of this objection, I may observe, that gases suddenly secreted in indigestion, hysteria, and the last stage of typhus, gastritis, enteritis, peritonitis, hysteritis, are in all probability very different, though they have not as yet, so far as I am aware, been analysed. There is as yet no analysis of the gases in abdominal, intestinal, or uterine tympanites, or that arising in the last stage of inflammation in the head, chest, abdomen, pelvis, or in other organs. Some modern authors assert, that gases in the cavity of the womb arise from

the decomposition of some substance, either a putrid foetus or its membranes, or coagula in the uterus, that such exhalations may escape from the vagina during life, and are sometimes inflammable, or may be found in the organ after death.—(*Boivin, Duges*).

It is perfectly clear, however, that intra-uterine gases are produced in some cases by exhalation or secretion, and not by chemical changes. I have repeatedly known women, who had children regularly in due succession, expel gas from the uterus during lactation, and when there was every reason to believe there was no foreign matter in the uterus. It has been urged on the other side, that leucorrhœal mucus, the menses, the ichor of cancerous discharge, and clots of blood may be decomposed and give rise to aëriform fluids. This is extremely probable.

Dr. Denman and Dr. Gooch never met with real idiopathic physometra, which was retained in the womb, and distended it; though they frequently attended cases in which air was formed in, and discharged by the uterus several times a-day, by child-bearing women in the absence of pregnancy.

Frank, Mauriceau, and others, relate cases in which the womb was distended as much by gas as at the fifth or sixth month of pregnancy, and the woman, on stooping and making exertion, expelled a quantity of air from the vagina, and the abdomen completely collapsed.

When the uterus is distended with gas, and gives a tympanitic sound on percussion, the finger, or a gum elastic catheter, has been passed into the os uteri, the gas has escaped, but in some cases re-accumulated, and often required a repetition of the same operation.

Uterine gas is not offensive in general, although it is sometimes very foetid. In one case, a tube was introduced into the womb for the purpose of applying fumigations, gas issued copiously, coagula followed, and a cure was speedily effected. In other cases of long standing, there were foetid exhalations for different periods, and the uterus was found to be filled with putrid effluvia, its interior surface ulcerated, and the orifice closed by the tumefaction of its lips or borders. It is also to the putrefaction of morbid products of conception, that the air bladders of moles are to be attributed.

Mauriceau and Frank describe cases during pregnancy, in which the gas must have been exterior to the membranes of the foetus, but these are of very rare occurrence.

The symptoms of physometra are too characteristic to be mistaken, the enlargement and circumscribed tumour of the uterus, sounding like a drum on percussion, and all the signs of pregnancy being absent, (see p. 150); all these lead to a correct diagnosis.

The disorder is not dangerous when idiopathic, and unaccompanied by organic disease of the womb.

Treatment.—The indications of treatment are, to improve the general health by tonics, chalybeates, aperients, to give issue to the gas, and to prevent its future regeneration. The latter will be accomplished by baths, uterine, tonic and antiseptic injections, as those of quina, chloride of lime, combined with the sedative solution of opium, morphia, or other narcotics.

When the general health and the tone of the uterus are restored,

pregnancy may occur, and effectually cure the disease. Such was the result in the case of a lady aged twenty-eight, the mother of four children, and the subject of three bad abortions, who had carried a dead and putrid infant for six months, and whose health was seriously injured by the most severe affliction. Nevertheless, she gradually recovered, and has since given birth to three healthful infants.

The introduction of a gum elastic tube into the cavity of the uterus is highly advantageous in most cases, and can be readily passed by any one acquainted with the relative position of the internal genital organs. A catheter may be passed into the uterine cavity, and an injection thrown from a syringe.

Dr. Osborne, of Dublin, describes the case of a hysterical woman, aged twenty-two years, who was under his care in Sir Patrick Dunn's Hospital in Dublin. There was also abdominal tympanites. He introduced a gum elastic tube, of nearly three feet in length, with a button and hole at its extremity, as first proposed by Dr. O'Beirne, and applied to it an air-tight stomach-pump, proceeded to pump out the gas, and was able to do so with but few interruptions, which were speedily overcome by shifting the place of the tube in the intestine, or by injecting warm water to clear the holes from accidental stoppages. In about an hour, the abdomen was reduced to nearly the natural size, with complete relief of the painful distention. In passing the tube through the rectum and sigmoid flexure, it was occasionally retarded by folds of the mucous membrane, but was soon freed by injecting warm water, and thus procuring distention of these parts. Dr. Osborne judiciously remarks, that portions of the intestines distended by flatus beyond their power of contraction, resemble the bladder when paralysed in consequence of a retention of urine, and cannot contract effectually, until a diminution of their contents is first obtained; hence it is probable, that this method may not only prove a temporary relief, but may contribute to the permanent removal of many cases of torpidity of the bowels.—*London Medical Gazette*, vol. vii, p. 825; *Dr. Graves's Lect. in Dr. Ryan's London Medical and Surgical Journal*, vol. ii., p. 781; see also *Dr. O'Beirne on Defecation*; and *The Cyclopædia of Practical Medicine*.

These remarks equally apply to over distension of the uterus, either by gas or fluid, and afford strong and conclusive evidence of the value of such mechanical means in these diseases, as already mentioned.

I have endeavoured in the preceding remarks, to place before my readers the nature and treatment of gases evolved in different parts of the body, with the hope of relieving much human suffering, and particularly in physometra or tympanites uteri, which although a comparatively rare disease, is by no means generally understood, so far as I can judge from many cases in private as well as in public or hospital practice. I shall only add, in conclusion, that Dr. O'Beirne and Mr. Carmichael have published, within the last few years, in the *Dublin Medical Journal*, some marked cases of strangulated hernia and other diseases, which were relieved by a tube passed into the bowels, even when the patients were placed upon the table for a dangerous operation.

Polypous Tumours in the Uterus.—Polypous tumours are often attached to the cavity or neck of the womb, as well as to the vaginal aspect of

the latter part, as also to the peritoneal or external surface of the organ. They vary in size, from that of a walnut to that of the adult head; they develop slowly in general, and when they grow from the cavity of the womb, they gradually descend through its orifice into the vagina, and pass from this canal to, or through, the external genital aperture.

They may be fleshy, fibrous, or vascular; they may be hollow, and contain atheromatous matter, hair, or even blood.

The symptoms in the early growth of polypus, are uneasiness or pain in the uterus, loins, bladder, rectum, &c., but when the polypus advances in growth, and passes through the uterine orifice into the vagina, the symptoms will be much aggravated, and there will often be more or less hæmorrhage from the uterus, and but rarely from the tumour. On passing the finger to the uterine orifice, its lips will often be found dilated by a convex soft tumour. But the polypus may enlarge to a considerable size in the cavity of the uterus, and not easily, or at all descend through the mouth into the vagina. In other cases, it may arrive at the uterine orifice, and again descend into the cavity. This usually happens during menstruation, when the uterine pains often become so severe, as to resemble those of parturition; but in a few days after the cessation of the catamenia, the uterine orifice will be closed, and the polypus cannot be felt.

When these expulsatory efforts recur from time to time, the polypus descends into the vagina, it is of a pyriform shape, its base inferiorly, and its apex superiorly, attached by a neck to the uterus. It may now occasion a sense of weight in the rectum, or uneasiness in the bladder, and more or less derange the evacuation of these organs; causing tenesmus, impeding defecation, and inducing a frequent desire to evacuate the bladder. It is now a source of much irritation to the womb, vagina, rectum, and bladder, and occasions all the symptoms of prolapsus uteri, (see p. 374). The polypus becomes altered by the contact of the air, distended with blood by the compression of the uterine orifice, which prevents the return of the blood through it, and hence it rapidly increases in size, and becomes the source of abundant mucous secretion, accompanied by frequent and copious discharges of blood, which greatly debilitate the patient.

If the disease is allowed to continue, it gradually enlarges the vagina, and may finally pass through the vulva, when it will hang between the lower extremities, like procidentia, or inversion of the uterus, causing many of the painful symptoms of these diseases, (see p. 374). When the polypus passes externally, it must evidently pull down and depress the fundus uteri, and draw it more or less through the os uteri, causing inversion of the womb, (see pp. 375, 382). In such cases, there may be much pressure made on the rectum and bladder, and their functions be more or less impeded.

When the polypus hangs externally, the patient can evacuate the bladder and rectum with more ease than while the tumour was in the vagina, but she experiences pains in the back, loins, groins, and inferior extremities, which will be diminished, or entirely cease, on reducing the polypus and replacing it in the vagina. But, if the tumour is allowed to hang externally, it may rapidly swell, inflame, and become irre-

ducible, and sometimes is attacked with gangrene. In some cases, the hæmorrhage proves fatal before the polypus escapes from the uterus into the vagina; in others, the polypus may be expelled by uterine efforts alone, with or without fatal loss of blood, the tumour may inflame, and the inflammation extend to the uterus, and prove fatal; and finally, polypus may produce sterility, abortion, and even end fatally, or develop after conception, enlarge and impede parturition, sometimes causing destructive hæmorrhage during that function.

When polypus is attached to the lip of the os uteri, the latter becomes elongated, and confounded with the pedicle or neck of the tumour, so as to render it impossible to distinguish the line of demarcation, or one part from the other. This is a point of importance, when a ligature is about to be employed, or an incision made to detach the morbid growth.

Polypus occurs most frequently at the middle period of life, to married women, and to those who have had children, from the age of thirty years upwards. Its causes are unknown.

Its diagnosis is simple in most cases, as a due consideration of its progress will enable the practitioner to distinguish it from pregnancy, (see p. 150,) from vaginal hernia, (see p. 360), prolapsus uteri, (see p. 374), procidentia uteri, (see p. 374), and inversio uteri, (see pp. 375—382).

The prognosis is generally favourable, although in some cases, there may be profuse or fatal hæmorrhage, or various malignant diseases, which may extend to the womb and vicinal organs. The disease is less dangerous, when the polypus is so low down in the vagina, that a ligature may be easily applied to its pedicle or neck, or this part incised or separated by torsion or twisting of it; but even in these cases, fatal hæmorrhage, or inflammation may ensue.

Treatment.—The indication of treatment is to remove the polypus, by placing a ligature upon its neck, by incising that part, or by twisting it five or six times with the fingers or a forceps. It has also been torn away, in imitation of its laceration, by the spontaneous efforts of the uterus.

Various instruments have been devised for applying the ligature, as those of Levret, Museux, Herlineaux, Dessault, Bouchet, Paul Dubois, Gooch, &c. The instrument invented by Nissen, in 1789, and modified by the late Dr. Gooch, is generally preferred in this kingdom. It consists of two tubes, through which the ligature is passed, they are then placed parallel to each other, at some distance, a fold of the ligature being at their distal extremities, one tube is passed on one side of the neck of the polypus, the other on the opposite; the tubes are then placed side by side, the ends of the ligature are tightened and knotted round the handles of the instrument. The ligature can be gradually tightened, by twisting the instrument from time to time.

Dr. Gooch advised, that the ligature should not be placed on the neck of the uterus, and that if a portion of the pedicle of the polypus were excluded, it would wither and fall off, similar to the remains of the umbilical cord.

The effect of the ligature will be, to prevent the return of the blood from the polypus, and this part must enlarge, swell, become the seat of

mucous or sanguineous discharges, or will speedily separate by sloughing from the womb.

It may require from three to four weeks before the tumour putrefies or sloughs, more especially when it is fibrous or fleshy. It may also happen, that the polypus may become painful soon after the application of the ligature, more especially if too tight, and this has been followed by peritonitis, which has proved fatal.

When the tumour begins to putrefy, the chlorides may be used as antiseptic vaginal injections, to correct the fœtid odour.

Baron Dupuytren found the ligature productive of so much pain and danger, that he latterly preferred the section of the neck of the polypus, which he readily and easily accomplished in the following manner. He seized the body of the polypus with a curved forceps, drew it gradually down to the vulva, which it distended, then external to it, when he divided the neck of the tumour with a bistoury, or a strong pair of curved scissors, which contused the parts while incising them, and thus preventing hæmorrhage. In some cases in which there were adhesions, he gradually tore away the polypus, taking care to make such torsion, or such contusion of the neck, as to prevent hæmorrhage.

When the pedicle is broad or large, and that its pulsations indicate the presence of large arteries, a ligature should be tightly drawn before the removal of the tumour.

It is important to observe, that in the early progress of polypus, the tumour may be so small as to be inaccessible to the finger, or situated at a distance within the os uteri. The irritation is finally so great, in such cases, as to occasionally require a vertical incision of the uterine orifice, so as to admit the descent of the polypus into the vagina, as practised by Beclard, Dupuytren, and others.

I may here be allowed to state, that in a case of this kind which fell under my care, I pushed the polypus back into the uterine cavity with the fingers, when all unpleasant symptoms ceased, and did not return for weeks afterwards. This operation was purely palliative, but one more efficient could not have been performed under the circumstances.

When the os uteri is rigid, or very much closed, it will retard the descent of the polypus into the vagina; and in such cases it may be rubbed with an ointment of belladonna, as described in p. 207; and should this fail, as it often may, and the distressing symptoms already described continue, the only other remedy, or means of relief, is incision of the uterine orifice. I have already stated that polypous, and various other tumours, though very small and undiscoverable at the period of conception, may develope to a very large size with the gravid uterus, in proportion as it enlarges during pregnancy; in consequence of the determination of blood to the womb for the development of the new being, and that such various tumours or unnatural growths, may require removal when great impediments to parturition, (see pp. 280-1-2-3.) Such cases are recorded by many of the most eminent physicians and surgeons of the last, and present centuries, as Jackson, Pelletan, Parke, Merriman, D. Davis, Burns, Drew, Ryan, Beatty, Sir Philip Crampton, Bart., Ashwell, Heming, Mme. Boivin, and Professor Duges, &c., (see pp. 282, 283.) These cases are fortunately of

very rare occurrence, but may happen in the practice of the youngest obstetrician, and therefore require to be carefully studied.

Changes of Structure of the Uterus.—The uterus, in common with all organs in the body, being composed of many different tissues, or structures, is liable to a multitude of diseases, which may be arrested by proper remedies, but if neglected, become wholly incurable. In studying the diseases of the womb and its appendages, we must clearly understand the nature of the different structures, which compose these organs, and the functions which they are destined to perform in health, before we commence the study of their pathology, or their diseases, and their treatment.

In the first part of this work, I have given a most minute account of the anatomy and physiology of the reproductive or genito-urinary organs, peculiar to women, from p. 41, to 205, and from p. 205 to 384, &c.; and under the head of diseases of women, I have particularly dwelt upon all cases in which relief may be afforded, or a cure effected; but here it is to be remembered, that there is a vast number of diseases peculiar to the human female, which although admitting of great and incalculable relief, are as yet perfectly incurable; and these I shall now barely enumerate.

The changes of structure in the womb and its appendages, are extremely multifarious, as those of the mucous, fibrous, cellular, vascular, and serous tissues, which may be parasitic, tuberculous, steatomatous, cancerous, calcareous, cartilaginous, osseous, fungoid, hæmatoid, hydatid, &c., as already described.

In addition to the diseases already considered and enumerated, we have the different forms of cancer, tuberos, consisting of cancerous tumours, ulcerous, fungous, and hæmatode, still all incurable, even after incision; taking the result of partial or complete excision of the neck, or body of the womb, in the cases recorded by Hull, of Manchester, Blundell, Lisfranc, Oslander, Dupuytren, Recamier, Avenel, Colombat, Hatin, Guillaou, Delpech, Gendrin, Tarral, Dubled, and many other obstetricians of minor note. Cancer still remains as incurable as in the dark ages, and even now, confirms the truth of the ancient axiom, “*Illi morbi qui non medicamentis curantur, ferro curantur, qui non ferro curantur, igne curantur, qui non igne curantur, hos existimari incurabiles.*” It was indeed true, to a certain extent, that those diseases, or rather some of them, which are not cured by medicines may be cured by iron or the knife; those not cured by iron, may be cured by fire, or the actual cautery, consisting of the red, or white hot iron; and those not curable by any of these means, ought to be estimated or considered incurable. The truth of this statement is attested by the fact, that cancer of the womb, as well as of every other part of the body, is still incurable; though never was there a disease, for which so many pretended effectual cures have been proposed.

In some cases the uterus, which weighs between two and three ounces, or a little more in the virgin and adult state of women who have not had infants, may be increased by diseases of various kinds, so as to fill the whole abdomen, and weigh 100 lb. avoirdupois, causing derangements not only in the bladder, rectum, and vagina, but in the abdomi-

nal, thoracic and cephalic organs, including the senses of vision, hearing, taste, smell, and touch. I have adduced abundant evidence in proof of this position, attested by many of the most eminent of the medical profession of the last and present centuries, whom I have quoted in the preceding pages. There is, however, one great consolation, that vast and inestimable relief may be afforded in obscure diseases of the womb, and its appendages, although their pathology, or nature, cannot be discovered during life, and though many are incurable.

In such cases, the general health may be improved by means of tonics, chalybeates, aperients; indigestion in all its shades removed, and pain relieved by the internal and external use of narcotics, or direct sedatives; a plan of treatment applicable to all the obstinate, or incurable diseases of the uterus, ovaries, and pelvic organs.

In cancerous, or other malignant diseases, and ulcerations of the womb, we employ the numerous means just enumerated; inject chloride or iodide, or astringent lotions into the vagina, or womb, give morphia, or the sedative solution at bedtime, or hemlock, henbane, &c.; during the day, alternated with the most powerful tonics, apply plaisters of belladonna, opium, hemlock, henbane, &c., to the loins, and cause the bowels to act daily by some means or other; and such is the general treatment of all chronic diseases of the pelvic organs; liable, of course, to the various modifications already described in these pages. In conclusion, I have to state, that the pathology or nature of a vast number of diseases of the womb, ovaries, and uterine or Fallopian tubes, cannot possibly be discovered in their early stages, or even during life; and the only but great consolation to medical practitioners is, that they diminish or remove for a time, a vast deal of suffering of both mind and body; although they cannot cure the numerous diseases which induce them. Many distinguished authors and morbid anatomists, of this and other countries, have given, and delineated, the numerous morbid appearances, as my late revered friend, Dr. Hooper, Professor D. Davis, Mme Boivin, and M. Duges; while many other distinguished moderns have described them, as M. Nauche, M. Capuron, M. D'Huc, M. Hatin, Dr. Burns, Dr. Blundell, and still more recently Dr. Churchill, of Dublin, besides the host of distinguished authors and essayists already quoted in the preceding pages.

Moles.—These are growths supposed to be caused by degeneration of the germ, or the placenta; and hence termed false germ, blighted foetus, degenerated embryo, fleshy, and hydatid mole. They never happen except as a consequence of impregnation. (Fernel, Murat, &c., &c.) Conception may occur and the embryo develop, while a mole remains in the uterus; or one foetus may die and be converted into a mole, while the other develops and arrives at maturity. The placental mole contains membranes from which the ovum often escapes, and cannot be discovered when the morbid growth is expelled.

The fibrinous mole has no cavity, and is more dense in structure than the former. Both these species are expelled, accompanied by slight or profuse hæmorrhage.

The vesicular mole consists of a number of small vesicles or sacs,

filled with a watery fluid. Such cases are described by Malpighi, Wrisberg, Leroy, Boivin, Hatin, and numerous other authors.

I need scarcely mention, that it is utterly impossible to arrive at any positive conclusion, as to the existence of any kind of mole in the uterus; and, therefore, that the treatment must be calculated to relieve urgent symptoms. I may also add, that in all doubtful cases, caution is necessary, and that the use of the ergot of rye, sounds, &c., requires very great circumspection and care, in such cases, which are always obscure.

Uterine Neuroses.—The uterus, in common with all organs in the body, is liable to neuroses or disorders of function. These are hysteralgia, or irritable uterus, hysteria, nymphomania, nervous or supposed pregnancy, and anaphrodisia.

Hysteralgia.—Hysteralgia, or periodical pain in the uterus, is a functional disturbance similar to pain in the stomach or intestines, termed gastralgia, cardialgia, and entralgia. This disorder may exist from puberty to the critical age, especially at the return of and during menstruation, and is also designated dysmenorrhœa. In other cases, hysteralgia exists during the intervals between menstruation, and sometimes continues for years, and has been called irritable uterus, by Gooch and others. It is so painful in some cases as to prevent sexual commerce, in others, it speedily succeeds impregnation; but pregnancy rarely, indeed scarcely ever happens during real hysteralgia. It is often induced after the first conjugal approach, and will be more intense according to the disproportion between the sexes.

On making a vaginal examination, the uterus is very sensitive, and pained on pressure; is not enlarged or otherwise diseased at first, even after the lapse of years, but may at length be disorganized. The pain is so much aggravated by the erect position, and by motion, that the patient is often compelled to pass the greater part of her time on a sofa, or in bed, and is obliged to observe strict continence.

Treatment.—The chief remedies are general bleeding, leeches to the loins, groins, or vulva, warm, general, and hip-baths, mucilaginous, and opiate lavements, and vaginal injections, narcotic plaisters, liniments, or cataplasms, to the hypogastric and lumbar regions, rest in the horizontal posture, continence, nourishing diet, and proper attention to the general health. It often happens, that all these means fail to afford relief. In such cases, M. Villermay, who first described this disorder, advised an issue or seton to be placed in one of the upper or lower extremities.

Hysteria.—This disorder has long been referred to the uterus, and of late to the cerebellum, or brain.

It is the general, indeed almost the universal opinion, that the disorder arises from a morbid condition of the uterus, and this has been well established by M. Mongelas, in his special researches on the origin or seat of hysteria. The phrenologists, however, refer it to the cerebellum,—but these are now very few in number.

There are few disorders whose symptoms are so numerous, and so varied, even in the same individual at different times.

The disorder is preceded by nervousness, yawning, stretching, dejection of spirits, anxiety of mind, tendency to laughing, or weeping, which are accompanied by a sensation in the lower part of the abdomen, commencing in the womb, ascending through the bowels to the stomach, chest, and throat, as if a ball or globe had passed through these parts, and causing a sense of choking. This rising was termed the *globus hystericus*, and popularly, "rising of the lights," and when urgent, compels the patient to stand still. Flatulency is also a troublesome symptom, and causes a rumbling in the abdomen, termed *clangor intestinorum*.

There is often dull pain in the left side in the region of the spleen, and also about the flexure of the colon, and in many cases, there is spinal irritation, which is evinced by pressure on some of the vertebræ.

There is also a pain in some part of the head, but generally in either temple, and this has been compared to that caused by a nail being driven into the affected spot, and hence the former designation of it, *clavus hystericus*. When these symptoms follow each other in rapid succession, and arrive at their height, the respiration becomes laborious; there is palpitation of the heart; the patient wishes for exposure to the open air, and the face and body may become covered with a cold clammy perspiration, the pulse being small and scarcely perceptible. The unpleasant sensations extend to the brain, trunk, and extremities, which are attacked with convulsions, as in epilepsy, accompanied by alternate fits of laughing, crying, and screaming. The speech is incoherent, there is a temporary delirium, and a frothy saliva expelled from the mouth.

The spasms at length abating, a quantity of gas is evacuated upwards, with frequent sighing and sobbing, the patient regains the powers of sense and motion, does not remember any thing that has occurred during the fit, often feeling a severe pain in the head, and a soreness over the whole body.

In some cases, the fit is so violent as to require three or more persons to hold the patient. The face becomes red and pale, the teeth are firmly closed, the abdomen becomes depressed, or distended with gas, and is pained on pressure; and in intense cases, the patient lies as if dead for several hours, as will be more fully noticed hereafter.

Here it is worthy of remark, that in incipient cases, only few of the symptoms may be present, and there may not be any convulsive fits. I record this fact, as women seldom admit that they are hysterical, unless they suffer from convulsions, although some, or most of the other symptoms may be present. I might fill a good sized volume with cases of the various shades or species of hysteria, which have fallen under my own observation, and treatment; but I must content myself, in an elementary work of this kind, with a reference to the varied symptoms of this common and troublesome disorder.

In some cases, there are no convulsions, and the patient appears as if in a profound sleep, or in apoplexy, as there is neither sense nor motion. This state may continue for hours, days, weeks, or months, and approach to, or end in catalepsy. The paroxysm terminates in general, by a loud shrill shriek, by crying or laughing, and is usually followed by an abundant discharge of very limpid urine.

It is important to state, that at the commencement of hysteria many of the symptoms may be absent, and the fit does not continue longer than a few minutes, but when frequently repeated, may last for several minutes, or hours, or recur several times during the course of a day. The fits come on irregularly, though in some cases they recur at certain hours. The health is perfect in the interval between them.

The paroxysms are termed suffocating, apoplectiform, syncopal, cardiac, pertussiform, and cataleptic. These may be accompanied by palpitations of the heart and epigastrium, short dry croupal or spasmodic cough, aphonia, or loss of voice, for weeks, months, or years, dysphagia, or difficulty in deglutition, paralysis, or contraction of one or more of the limbs, chorea, neuralgia, acute sensation of cold or heat in some part, pains in the side of the thorax, especially in the left side, or in the epigastrium, and also in a small or large space, as in the intercostal and other muscles, the xiphoid cartilage, in fine, in any part of the body. Sir B. Brodie has proposed the term hysteria of the knee-joint, to pain in this part; while others describe hysteria of the heel, instep, hip, ankle, &c.

Hysteria resembles epilepsy, but there is no globus hystericus, no clonus, no clangor intestinorum, and no copious discharge of limpid urine, in the latter disease.

Hysteria can scarcely be confounded with apoplexy, which generally occurs at the middle or advanced period of life, to persons of full habit, and very rarely at puberty, or at the adult age. I have known cases in which girls, and young women of robust habit, remained in a senseless state, as if in apoplexy, for twenty-four and thirty-six hours; and other authors assert for a much longer period. Some very singular cases of the multifarious species of the disorder, are well described in Tate's work on Hysteria. This author records instances in which the patients had remained for months confined to bed, took very little aliment, and appeared as if dead, only that the countenance was natural, or flushed, the pulse regular or small, and the respiration feeble.

The duration of hysteria varies very considerably; it may continue for months or years, or may persist during life, and then terminate in mania or epilepsy, but scarcely ever in death. It is generally cured by marriage, or pregnancy, or it may cease spontaneously, especially at the critical age, or by the effect of a strong vivid moral impression; or it may, in some few cases, excite disorganizations in the uterus and brain.

When the disease is of fifteen or twenty years' duration, it may pass into hypochondriasis, or may terminate in marasmus, or some organic lesion. The paroxysm may prove fatal, especially if apoplectiform, when death will be caused by apoplexy.

Hysteria usually commences about the age of puberty, but some of the symptoms are often observed in childhood, especially when the parents have been hypochondriacal or hysterical. The disorder is also very intense in certain cases of ovarian disease, and is then accompanied by great depression of mind, and hypochondriasis. It may likewise be combined with chorea, a very distressing complication of disorders. I may here observe, that I have been consulted in two most obstinate cases of this kind, by the mothers of young ladies, both of whom suffered intensely from congenital chorea as well as hysteria, indeed they were

almost fatuitous, and yet desirous of ascertaining the safety and propriety of entering into matrimonial engagements. It was my opinion that both were incurable, and ought not to enter on the proposed change of life; they did so notwithstanding, but fortunately had no offspring, and therefore failed to transmit their distressing complaints.

The most frequent causes of hysteria are an excessive sensibility, or irritability of the uterus, the abuse of venereal pleasure, strong and frequent emotions, voluptuous conversations, the perusal of licentious works, frequenting balls, theatres, dances, every thing that excites the general sensibility, and especially that of the genital organs, disorders of menstruation, masturbation, privation of sexual commerce after it had been long enjoyed, and chronic inflammation of the uterus or ovary. These diseases influence not only the brain and the uterus, but all other parts of the body.

The occasional causes are all vivid emotions of the mind, as jealousy, fear, chagrin, surprise, &c., sudden suppression of the menses or lochia, the sight of hideous objects, conception, pregnancy, parturition, and all the diseases of the internal and external genital organs, (Nauche).

I must here observe, that hysterical persons are very sensitive, nervous, fanciful, frivolous, remarkably self-willed, capricious, irascible, and liable to sudden changes from excessive joy to profound grief, which may derange the mind for a short time, or permanently. They are also subject to anxiety, ennui, nervousness, the most sudden changes of temper, without any reasonable or just cause, which render them unreasonable and tyrannical to every one, and generally almost intolerable to those in immediate contact with them. They are so unreasonable and unjust in some cases, that they frequently may be considered monomaniacal, or perfectly insane. I have observed numerous cases in my own practice, as well as in that of others, in which domestic life was rendered the greatest misery upon earth, and in which a separation or divorce ought most assuredly to be allowed, without the tedious, expensive, and unjust state of the present marriage laws in this country. Were these remedies to be obtained by a speedy legal process, a vast number of hysterical women would be speedily cured and brought to their sober senses, and to a proper line of conduct. I here refer to those numerous cases in adult and married life, which too often depend upon bad temper and unreasonable expectations; but not to those cases which occur from puberty to the adult age, which generally arise from physical derangement, over which the mind has the greatest influence in most cases. It is well known that if hysterical persons make a strong mental effort to prevent the attack of the disorder, they will generally succeed; and I have observed many instances, in which moral means alone effected a cure. There are, however, numerous cases in which these will fail, and medicines be indispensably necessary, as will appear in the succeeding account of the treatment.

Treatment.—The indications of treatment are to allay the spasmodic symptoms, and to strengthen the nervous and uterine systems during the intervals of the fits.

The first indication is fulfilled by bleeding in full, but not in delicate habits; stimuli applied to the nose, as hartshorn, and the different pre-

parations of ammonia, burnt feathers, cold water sprinkled or thrown on the face, rubbing the temples and forehead with ether, vinegar; and the internal use of antispasmodics, as ether, camphor, assafoetida, opium, valerian, hydrocyanic acid, laurel water, belladonna, morphia, sedative solution of opium, and immersion of the hands or feet in warm water, musk, castor, cyanuret of mercury, zinc, &c.

The first thing to be done during the fit, is to loosen the dress, to allow free respiration, and the movements of the limbs and body, due care being taken that no part shall be injured or wounded.

When the woman is of full habit, or suffers from the apoplectic form of the disease, she may be bled from the arm, or leeches, or cupped on the back of the neck, and the bowels acted upon by strong drastic purgatives, or by clysters combined with assafoetida, castor, opium, or the other powerful narcotics. It will be also advisable to apply stimulating frictions to the face, chest, and extremities, so as to favour respiration and circulation, and to relieve the brain, (see p. 194). Blisters, sinapisms, cold to the head, and counter-irritation are employed for the same purpose.

When the woman is delicate, the free use of antispasmodics will be beneficial. The best means for preventing a return of the attack are those which diminish the irritability of the uterus and brain, as sedative vaginal injections, antispasmodics, general or local bleeding behind the ears, or from the nape of the neck, near the vulva, or on the upper part of the thighs. The mind should be tranquillized, and all exciting or depressing passions avoided, as well as all means which affect the nervous system. Exercise on foot, or on horseback, or in a carriage will be beneficial. The perusal of romances and other works of imagination ought to be avoided. The greatest care should be taken to prevent the perusal of licentious productions, which are of late years very often clandestinely introduced into schools and families by itinerant hawkers and others. The patient should also avoid balls, theatres, and places of public amusement, which are often grossly and shockingly indelicate; and she should retire to rest when sleep approaches, and rise on waking, so as to prevent the wanderings of the imagination, and vicious habits which result from them. She should use tea, coffee, cocoa, chocolate, spirituous or fermented liquors in moderation, or entirely abstain from them. Travelling, and the use of chalybeate, and of sulphurous thermal mineral waters, change of air and scene, and innocent diversions are valuable adjuvants.

A moral treatment ought to be adopted, when hysteria is caused by excessive organic excitement; and marriage be advised should that appear to be the object of nature. When hysteria arises from torpor, as in many cases of amenorrhœa, it may be proper to stimulate the organs by electricity, apply blisters to the hypogastrium and sacrum, with cupping glasses on the inferior part of the abdomen, and superior part of the thighs, with hip-baths, purgative clysters, aloes, scammony, gamboge, &c., (see pp. 339-40-41).

When the uterus is highly sensitive or irritable, narcotic injections may be introduced by the vagina, as advised in hysteralgia, (see p. 400).

Every means for the restoration of the general health should be em-

ployed, as tonics, chalybeates, warm or cold, simple or sea bathing, and all urgent symptoms removed by proper remedies.

The pertussiform paroxysm has yielded to quina, (*Piorry, Journal, Univ. et Hebdom, T. 10*), the dyspnœa to digitalis, the pains in the sides to the cyanuret of mercury, the painful and permanent rigidity of the limbs to pediluvia, warm baths, and powerful antispasmodics, used both internally and externally, or when these fail, to acupuncture, (*Pelletier, Arch. de Med. Octobre, 1828*), or to other kinds of counter-irritation. Recamier found belladonna an effectual remedy. When there is pain in the region of the spleen, in any part of the spine, or in the left inguinal region in the course of the sigmoid flexure of the colon, leeching, counter-irritation, by antimonial or ammoniacal ointments, or sedative plaisters, as those of belladonna, opium, hemlock, &c., may be applied over the affected parts with great advantage. In such cases the menstrual secretion is generally sparing, dark-coloured, and offensive, and will require a proper use of emmenagogues, (see pp. 339-40-41-42-43). Although the preceding remedies frequently afford great relief, they rarely cure hysteria; and this led M. Georget, to observe, it is best to do nothing, and not torment the patients.

It is very true that many hysterical cases remain a long time under treatment, and are not removed by any means, although great relief is obtained, and particular and painful symptoms are cured; yet most cases disappear by change of life, by marriage, and especially when there is offspring. There are exceptions, but they are few in number.

This fact has led the German writers to propose pressure on the os uteri, in painful menstruation accompanied by intense hysteria, a practice I have repeatedly found to give temporary relief.

Nymphomania,—*Furor Uterinus*,—*Erotomania*,—*Metromania*,—*Uteromania*,—*Andromania*,—*Hysteromania*,—*Clitorimania*.—These terms have been applied to designate a violent and insatiable desire in women for sexual union, expressed by the most obscene proposals, impassioned solicitations, and immodest gestures, which were totally opposed to the former modesty of the individual.

The pathology or nature of this disease is not known at present. It is ascribed by some to a simultaneous irritation in the sexual organs, and cerebellum; and by others to a morbid condition of either organs. According to more, it is a species of mental alienation, but all these opinions may be fairly questioned, and disputed.

It is proved beyond doubt, that inflammation of the uterus, ovary, and external genitals, as well as intolerable pruritus, or itching of the latter, caused by cutaneous diseases or certain eruptions, vicious habits and repeated excitements, usually exist unaccompanied by nymphomania. It is also a fact, that pruritus often causes excited passion and desire, though induced by some form of cutaneous eruption, but yet unaccompanied by any indecorum or mental derangement. On examination of the body after death, the pudenda or external genital organs were found inflamed or ulcerated in some cases; the clitoris, ovaries, and tubes turgid and distended in others; and the uterus free from disease in some violent instances.

The predisposing causes are, the age of puberty, a strong nervous

temperament, an extreme sensibility of the genital organs, increased by exposure to artificial heat, an indolent sedentary life, the state of widowhood, severe and long continued restraint, eruptions on the pubes or inner surface of the labia, nymphæ and vagina, painful menstruation, every thing which is capable of exciting, irritating or inflaming the sexual organs, and especially a vivid imagination, excited by voluptuous ideas, immoral works, inspection of licentious prints, statues, frequenting theatres, balls, allowing the mind to dwell on immodest objects, disappointed love, excessive development of the clitoris, masturbation, the sudden privation of sexual intercourse, erotic conversation, the abuse of alcoholic and fermented liquors, residence in warm climates, or situations, as manufactories, pregnancy, parturition, and the critical age. The disease is considered by some as a high degree of hysteria, and it must be admitted, that in the severe forms of the latter there is much libidinous conduct by looks and language; and much delirium, during which lovers and marriage are often mentioned. At the commencement of the disease, the imagination is excited, the looks are lascivious, there is a great desire for venereal enjoyment, which is restrained by reason while not alienated, and this also compels the patient to seek solitude, and to become melancholy, or dissatisfied, and despondent.

In some time the appetite fails, there is neither sleep nor rest, the ideas are more lascivious and obscene, the generative organs become affected with pruritus, or an insupportable itching. As the disease advances, every sense of modesty is lost, and the patient is guilty of the most obscene and disgusting acts. She now invites by looks, gestures, and solicitations the first and every man she sees, before whom she openly commits masturbation, she now becomes furiously delirious, there is complete mental aberration, she tears her hair and clothes, and throws the fragments at every man she beholds.

Mr. Mason, of Newington Butts, favoured me with the history of two cases of women after delivery, both of whom were kept mistresses, and one a former prostitute. They both recovered, and these cases supplied the foregoing description of the symptoms and progress of the disease.

The celebrated Pinel, describes the case of a girl at the age of puberty whose symptoms were intense, and she also suffered from an acrid genital discharge, dry tongue, and marasmus.

Ozanam describes the case of a woman, the mother of several children, who had been subject during pregnancy to mental aberrations, followed by stupor. She aborted at the sixth month, without pain, and without recovering from stupor. At the end of twenty-five days, she awoke in a state of the most unrestrained nymphomania. The pudenda were inflamed and ulcerated, to which nitrate of silver was applied, the redness and swelling disappeared after the second day, the symptoms of nymphomania began to improve on the fourth day, and from that time there was rapid recovery of health, (*Seances de l'Academie Royale de Medecine, Août 12, 1828*).

Professor Rech records a case nearly similar; the woman was aged twenty-four years, the mother of four children, and she became insane from domestic troubles. Intense nymphomania supervened. (Boivin and Duges, *Op. Cit.*)

The disease under notice is generally cured, unless complicated with severe inflammation, ulceration, or disorganization, and upon the whole it rarely proves fatal. It is said to terminate in mania, is considered by some to be a species of that disease, but further evidence and facts are wanted to warrant that conclusion. On opening the body, there are often traces of inflammation in the uterus, vulva, and ovaries, or in some of these organs; but facts are as yet wanted as regards the state of the cerebellum.

M. D'Huc suggests that when death occurs suddenly, it is probable that it is caused by violent spasm analogous to that observed in tetanus. It is well known that excessive genital excitement may cause convulsions, a most remarkable case of which is recorded in the learned and valuable work of Professor D. Davis, about which he was consulted, and which was induced by the manipulations of an empiric.

M. Duchatelet records, that somewhat less than a fourth of the prostitutes of Paris are manuels or tribades, that they are generally from twenty-five to thirty years, and have been in most cases in prisons from eighteen months to two years. Younger persons are generally vitiated by their elders. There are few old prostitutes who may not be classed with tribades. These disgusting and monstrous unions are more frequent than is generally imagined. Their correspondence is of the most amorous description, and expresses the most unbridled passion. Some of them are greatly annoyed when their lovers prefer the other sex; and more assault them, if stronger, and as often as they meet them. It has been remarked that these women are more frequently pregnant than ordinary prostitutes, and this circumstance has become the subject of jokes in the prisons. The explanation must be apparent to every one conversant with human nature.

I have elsewhere shewn the enormous amount of immorality and crime, the state of the trade in obscene books, prints, and toys, their introduction into boys' and girls' schools and families, by servants admitting hawkers, and hence the contamination of children, which is vastly promoted by the great immorality in all cities, towns, and districts. (See *Prostitution in London, &c.*) I have known children contaminated in nurseries and schools, on the prevention of which I commented at length in the production just quoted. Fortunately, however prevalent vicious habits may be, nymphomania is a very rare disease, as the records of medicine in all countries amply testify. But it is to be remembered that few disorders are so common as the varied forms of hysterical affections.

I must here record a fact of great importance, that I have been informed by unquestionable authority, that the language in the female side of the Hanwell Asylum is infinitely worse than in the other, and that it is almost impossible to comprehend how the females could ever have heard it.

Treatment.—The chief means of cure are religious, moral, and hygienic, and every thing calculated to calm the imagination, as change of air, the perusal of religious and standard works, proper moral and religious exhortations, constant occupation, agreeable society, residence in the country, travelling, avoidance of balls, theatres, and the perusal

of romances, and the society of the other sex, a vegetable diet, sleeping on a hair mattress should be strictly observed and employed.

The excitement of the genital organs should be allayed by narcotic vaginal injections, composed of opium, morphia, belladonna, henbane, hemlock, &c., with hip-baths, fomentations, leeches to the vulva, groins, superior parts of the thighs, or bleeding from the arm, foot, &c. M. Coster has proposed nauseating doses of tartarized antimony to diminish muscular action, others put on a strait-waistcoat, and more have amputated the clitoris, which is insufficient.

When nymphomania is excited by disappointed love, and the objections of parents or friends to marriage, they should be advised by the medical practitioner to consent to it.

When the disease is intense it is incurable, and should be treated as mania.

Anaphrodisia—Sterility.—In some rare cases women have a total indifference to the act of reproduction, and to the pleasures of love. This arises from a debility of the nerves which supply the womb and other genital organs, and also from inaction in the brain, which does not furnish the nervous influx necessary for putting the uterine organs in a state of excitation. There are many diseases of the latter, vices of conformation, or absence of some of the organs which produce the same frigidity and barrenness, which may be temporary or wholly incurable. The causes are all which enfeeble the body, as hard labour, excessive menstruation, or leucorrhœa or whites, an unhealthy habitation, chronic diseases, unwholesome food, masturbation carried to excess, &c.

The chief indications of treatment are to improve the general health, and the functions of the reproductive organs when possible.

False or Nervous Pregnancy.—There are some women of a nervous temperament, who are irritable and hysterical, who are often most anxious to have children, and frequently suppose themselves pregnant, when they are not so, though some of the symptoms, as suppression of the menses, nausea, vomiting, enlargement of the breasts, and lacteous serous secretion from them, and enlargement of the abdomen are often present. In some cases, the woman alleges, that she feels a motion in the bowels, and if a mother, she insists it is similar to that of a foetus on a former occasion. The diagnosis in such cases is readily formed, as on introducing a finger into the vagina, the uterus will be found in its ordinary condition. (See pp. 159—161).

False or nervous pregnancy may continue for months or longer, may disappear spontaneously, unless when tumours exist, and distend the abdomen. I have been repeatedly called in to consultations in such cases, of both married and unmarried women, to decide the existence or non-existence of pregnancy, or to assist supposed labour, when there was no foetus in the uterus, and even to perform the Cæsarian operation under similar circumstances.

I need scarcely observe, that mistakes of this kind do great injury to professional reputation, and may be avoided by carefully considering all the signs of pregnancy, which I have minutely described, from page 150 to page 166.

Diseases of the Ovaries.—The diseases of the ovaries are inflammation,

scirrhus, cancer, encysted tumours of various kinds, dropsy, hernial displacements, fibrous, osseous, cartilaginous, tuberculous, melanotic, cerebriiform, and other disorganizations. This class of diseases was little understood until the middle of the last century, and their pathology has been greatly improved within the last ten years, and deserves most attentive study.

I must here be permitted to observe, that it is necessary for the reader to peruse the account of the structure and function of the ovaries which I have already given in pages 53 and 54 of this work, previously to his study of their diseases. He will there find, that at the period of puberty, before, and during menstruation, as well as under all other excitements of the pelvic organs, the ovary is the seat of turgescence or congestion similar to that of the uterus, which has been repeatedly observed after death; that the organ is gorged with fluids, its blood vessels distended, its substance highly inflamed, the seat of abscess, and other morbid changes. These appearances have been observed in women, who have died during pregnancy and parturition, or after delivery, and also in cases of hysteria, and nymphomania. In some cases of labour, the congested ovary has burst, and fatal hæmorrhage escaped from it into the abdomen. In one case of this kind, the left ovary was as large as a hen's egg, was infiltrated with blood, and resembled a congested spleen, when death was caused by scurvy. It is, however, to be borne in mind, that the ovaries and uterus though turgid to a greater or less extent, before and during menstruation, and under different degrees of excitement, are not morbidly congested, inflamed, or otherwise diseased, under such circumstances; but yet they are very much predisposed to inflammation, and numerous disorganizations.

Ovaritis—Inflammation of the Ovary.—Acute inflammation of the ovary, can seldom be detected, unless in conjunction with metritis or metro-peritonitis, in the puerperal state, and even then, is of rare occurrence. Professor Duges examined 686 cases of metro-peritonitis in the years, 1819, 1820, and in only thirty-seven was the ovary inflamed.

The symptoms were pain extending towards the iliac fossæ, sides of the hypogastrium, to the loins, and thighs, which was increased by pressure, with more tumefaction and hardness in the iliac regions, than in simple metro-peritonitis. Perhaps, ovaritis seldom exists, except in hopeless cases of the latter disease, or in uterine phlebitis, formerly termed malignant puerperal fever, (see p. 330).

The violence of ovaritis is proved by the autopsic, or morbid appearances, after death, as abscesses, gangrene, &c.

The patient in walking, when labouring under a mild form of ovaritis, complains of dull pain in the hip, groin, loin, bladder, rectum, and one lower extremity, which is mitigated by the horizontal posture, and returns on change of position, more especially, during corporeal exertion. When the inflammation is acute, the pain becomes severe, deep-seated, circumscribed, pungent, and constant, and may derange the functions in all parts of the body. The pulse becomes frequent, the skin hot, there is fever, and the brain may be so affected, that all the symptoms of nymphomania may appear, (see p. 405), which induced some authors to ascribe that disease to ovaritis.

When the disease becomes chronic, the ovary enlarges, and forms a tumour, which, sooner or later, may be felt through the abdomen at one side of the uterus, ascend as high as the umbilicus, or finally fill the whole abdomen.

Andral quotes a case from one of the American journals, in which the ovary contained twenty pints of pus; and Logger records two cases, in which there were, thirty-six, and thirty-nine pints of the same fluid. It generally happens, that one ovary alone is affected, although both may be implicated in bad cases. During the inflammation, the affected organ may become adherent to all vicinal parts, as the womb, vagina, the bladder, and rectum, an abscess may form and the pus be discharged through any of these parts, or the urethra; or pass into the cavity of the abdomen, or escape from the parietes of the latter. (Boivin, Duges, Andral, Callisen, Seymour, &c.)

When ovaritis becomes chronic, it may terminate in any one of the diseases enumerated at the commencement of this article. The morbid appearances in acute ovaritis are, inflammation, pus or ulceration, the matter being discharged through some one of the parts just mentioned. When the disease is of some duration, there may be many abscesses in the different sacs of the ovary, or these may be totally obliterated, and incurable sterility induced, as well as most of the irremediable organic diseases, which will be described hereafter.

The causes are, excitement of the genital organs by moral or physical means, sudden exposure to cold, blows, or falls, on any part of the body, which may shake the ovaries; the use of abortives, the abuse of emmenagogues, in fact every cause, which may inflame the uterus.

I have frequently observed, that on close inquiry in cases of ovarian disease, the patients had had accidental falls, or contusions, which they forgot at first, but recollected afterwards. I might record many instances, in proof of this statement.

The treatment is the same, as in acute and chronic hysteritis, (see pp. 329-30). General and local bleeding, purgation, diaphoretics, baths, &c., in the acute species; and counter-irritants, narcotics both internally, and externally, in the chronic, as already advised.

Atrophy and Hypertrophy of the Ovary.—Inflammation of the ovary may induce atrophy or hypertrophy of the organs, one of which may be reduced to the size of a lentil seed, and the other very much enlarged in size, as Dr. Hooper observed in three cases. The ovary has been so enlarged in size as to contain 100 pounds weight of fluid. (Duret, 100½ pounds; Willis, 112; Samson and Wepfer, 120).

Encysted Tumours of the Ovaries—Ovarian Dropsy.—Cysts and tumours of the ovaries are formed by an accidental membrane, or by enlargement of the sacs of the organs, caused by inflammation. The parietes or walls of these encysted tumours are formed by a serous membrane internally, and a cellular membrane externally, which is covered by peritoneum. When the cysts have existed for a long time, the external membrane becomes fibrous, and consists of several layers placed over each other. In some cases, there are several compartments, but the serous cysts often form only one cavity.

The fluid contained is variable, it may be transparent, limpid, green,

yellow, brown, coffee-coloured or black, or resemble boiled starch, gruel, honey, suet, lard, or mortar. The surfaces of the sacs are often studded with hydatids, or with transparent vesicles. In the substance of the ovary, hairs, bones, teeth, calculous, and osseous concretions have been found, as well as the remains, or rudiments of a foetus, in cases of ovarian pregnancy.

It is beyond all question, that an embryo may develope to a certain extent in the ovary, distend that organ until it bursts, and escaping by some perforation of the rectum, vagina, bladder, or abdominal parietes. Madame Lacapelle, *Prat. des. Accouch.*, *Dict. de Med. and Chir. Pratiques*, tom. ix. p. 316.

In other cases, the embryo remains in a deteriorated form for some time in the ovary. It is, however, alleged, that foetal hairs, teeth, and bones have been found in young unmarried women before the age of puberty, according to Baillie, *Morbid Anat.*, Cruvelhier, and Seymour on the *Diseases of the Ovaria*; and moreover in different parts of the body, and even of the male sex, as in the cases, when one germ or embryo is included within another; but as both generally die before birth, though one may live to puberty and no longer, I think it extremely unlikely, that similar productions to those above enumerated in the ovary, have ever been found in any part of the adult frame of man.

I am fully aware, that Richerand, G. St. Hillaire, and many other distinguished physiologists, have clearly proved, that one embryo may be enclosed within another, or strange as it may appear to juvenile or non-medical readers, that a boy may be with child of his brother, and a girl of her sister; although death generally occurs in such cases during childhood, in consequence of the irritation of the bones of the foetus in the abdomen of the brother or sister; and I must here observe, that I have not met with an account of any case in my researches, which have, by no means, been the most limited, of such child of either sex having arrived at the adult age, under such circumstances.

I am ready to admit, that it is proved by ovologists, that one ovule or embryo may fall within the abdomen of another, before the parietes are developed, become enclosed and developed for some time, die and cause the death of the other during childhood, or before the age of puberty.

But to return from this digression, I have to state, that ovarian tumours are always caused by inflammation, often consequent upon abortion, or parturition, as well as by falls or blows upon the lower part of the abdomen, or by falls upon any part of the body, which must more or less concuss the ovary, or by metritis or inflammation of the uterus. The disease is most common from the age of thirty to fifty years, although it may occur before the age of puberty.

In one case which fell under my care, it occurred to a young lady of sixteen, the abdomen became as much distended as in the eighth month of pregnancy, and this state was suspected by the mother. There was, however, no symptom of uterine gestation, except the size of the abdomen, and the patient had received a contusion on the right groin. I considered the disease to be ovarian dropsy, treated it with iodide of potass, internally and externally, and a cure was fortunately effected in

three months. These remedies have totally failed in other cases of the disease.

In a second case, the young lady fell against the corner of a chair, which contused the left inguinal region, which was followed by ovaritis, and considerable enlargement of the ovary, and this did not yield to any plan of treatment.

A third case was that of a woman aged thirty years, the mother of four children. She had been repeatedly infected with gonorrhœa by her husband, and presented all the symptoms of ovarian dropsy in August 1836. She was ordered the iodated preparations, elaterium, and diaphoretics, which effected a cure. Since that time she has had two children, and is now, July 1840, labouring under a return of the disease, which has nearly yielded to the same remedies.

A fourth case was that of a girl aged twelve years, impuberous, who presented all the symptoms of abdominal dropsy. The ordinary remedies having failed, and the abdomen enlarged so much as to impede respiration to a great extent, I proposed and performed paracentesis, or tapping. I extracted about two quarts of fluid, but no more would flow, although the canula was not obstructed, and fluctuation was most distinct.

Various remedies were tried in vain, and the girl ultimately died. I was allowed to examine the body, and discovered that I had penetrated a large sac, and evacuated its contents; but that there were several others filled with fluid, which of course, could not be touched by the instrument, though they formed a tumour which ascended into abdomen above the umbilicus.

A fifth case, was that of a woman aged forty years, the mother of six children. She had suffered from apparent abdominal dropsy for eight years, which came on slowly, and on one side, unaccompanied by thirst or paucity of urine, which is usually the case in ovarian dropsy. I tried various remedies in vain. At length the abdomen became distended to so great a size, as to impede respiration, and I was allowed to perform the operation of tapping. A fluid like boiled starch was extracted, and as it flowed into the vessel, it became thick, like size, and filled a common wooden house bucket.

Dr. Hooper relates a case of a similar kind to the last mentioned, for which he proposed tapping. The patient, however, refused to submit to the operation,—“at length the belly burst, the fluid which escaped was more than a pailful in quantity, and so thick, that it was like strong jelly under the feet. The patient was a lady about fifty years of age, who had not been married. When the surgeon was passing a bandage round the body, he heard a rattling noise within, and when he felt the belly and pressed it, the noise was very distinct, and like that which stones make when shook together. He introduced his fingers through the ruptured part, and easily detached and pulled out several portions of bone, of irregular shape, some two inches long, and about one in thickness, and others smaller. Still the rattling was occasionally repeated, another surgeon was sent for; and it was determined, that the opening should be enlarged, which was done. Several more, of large size were extracted. The wound healed, and the lady lived many years. This

was an instance of hygromatous ovarium, or encysted ovarian dropsy, with masses of bone and flesh.”—*Hooper’s Morbid Anatomy of the Human Uterus*.

This is a very important case, though rather too loosely described, which is to be ascribed to the advanced age, and fatal infirmities of Dr. Hooper, when he recorded it. The description of the bones is most unfortunately too vague, and no one can be convinced whether they were embryotic or not. The case, however, is in some degree similar to the last I have given, and on this account, as well as for its other features, I deemed it right to introduce it into these pages.

Ovarian dropsy is the most common of all encysted dropsies, is often complicated with the various other diseases of the ovary already enumerated, and those hereafter to be described. In some cases a portion of the ovary may contain fluid, while another may be affected with scirrhus, steatomatous or cerebriform disorganization.

The cyst, in such cases, is generally fibrous, and sometimes muscular and reticulated, it may be thin or thickened, and sometimes cartilaginous or osseous, (Hooper). It may also fill the whole abdomen, (see preparations in the museum of the Royal College of Surgeons, London).

In some chronic cases the cyst is adherent to vicinal parts, while in others there are no adhesions. When the disease is chronic the sac may adhere to the uterus, which it may surround, and the uterine tubes may be considerably elongated and enlarged, (Montaulieu, De Hean, Cruvelhier, Boivin, Duges, &c.); and in extremely bad cases the tumour may be attached to the parietes of, as well as to all the viscera in the cavity of the abdomen.

The interior of the sac or sacs may be smooth, resembling serous membrane, or uneven or mammelated, (Morand, Burns), or lined by a false membrane, and lastly, the sacs may communicate with each other, (Baillie, Cruvelhier).

I have already described the quantity and quality of the contents of these sacs in the concluding part of the preceding article, and shall here only remark, that the fluid which they contain may be transparent, yellowish, greenish, yellowish brownish, sanguineous; and in consistence, glutinous or pultaceous, ropy, adhesive or like glue. M. Cruvelhier states a fact which I have sometimes observed, that in multilocular dropsy, or when there are different sacs, each may contain a particular production—aqueous, gelatinous, sanguineous, fatty, chalky, calcareous, osseous, &c.

Some of these productions may become decomposed, so that foetid gas or sanious matter may escape through the canula of the trocar.

A question arises as to the origin of these sacs, are they the enlarged Graafian vesicles? (see *Anatomy of the Ovary*, p. 52), or are they newly formed? I am inclined to believe that they are enlarged vesicles, and I do not agree with those who consider them diseased by insufficient impregnations, similar to pediculated hydatids, ascribed to the same cause, as De Hean, Cruvelhier, Seymour and others. These authors seem to forget, that hydatids have been developed in every part of the body, even of man, and consequently cannot possibly be caused in the manner mentioned in all cases.

Ovarian dropsy usually occurs at the middle period of life, and to married women, whose genital organs are in full activity, but the disease may also appear in childhood and before puberty, as well as in women advanced in life who have not been married. It is often induced by external injury, or may come on without any evident cause. I fully agree with many modern authors, that the exciting causes of this and many other diseases of the ovary, uterus, and pelvic organs are often concealed by the patients.

The diagnosis of ovarian dropsy and other diseases is often very obscure. The primary symptoms are pains in the loin, groin, iliac fossa or inside of the hip, enlargement at the same side, and not in the mesial line or above the pubes as in pregnancy, the tumour gradually enlarges, presses on the abdominal viscera, deranges the digestion, impedes, when large, the descent of the diaphragm, and consequently deranges respiration and circulation, causing cough, difficulty of breathing, palpitation of the heart and great sinking of the pit of the stomach, headache, noise in the ears, derangement of the vision and of all the senses, confined bowels, piles, swelling of the inferior extremities, either œdema, anasarca, or varicose veins when a large tumour exists in the abdomen, presses upon the veins, and prevents the return of the blood from the lower limbs, and abdominal viscera to the heart.

Dropsical or other morbid enlargement of the ovary may advance, slowly or suddenly, without any perceptible injury to the health, until considerably developed, when the above symptoms and derangements may be induced.

These diseases have been confounded with ascites, or abdominal dropsy, hydrometra or dropsy of the womb, or that of the tubes, and most frequently with pregnancy.

The diagnosis is easily made by a due consideration of the history and progress of the last named diseases, and by the usual phenomena of pregnancy already described, (see p. 150, &c.).

The prognosis must depend upon the nature of the complications as when cancer, the different species of dropsy, &c. are present.

In some cases the distended cyst or cysts may inflame, ulcerate, or become gangrenous in certain parts, and the fluid may escape into the abdomen, intestines, rectum, vagina, or by ulceration through the skin. When the fluid escapes into the cavity of the abdomen, it may induce fatal peritonitis, (Seymour, Dance, Boivin), or this may happen without any serious result as in Smith's patient, or it may be removed by tapping as performed repeatedly by Delpech, who drew off during one operation, sixty pints of fluid, but the patient became gradually exhausted. The rupture of the sac may be caused by a fall or blow, the fluid escape into the abdomen, be absorbed and a cure effected. The experiments of Dr. Blundell on Abdominal Surgery, and the numerous cases of wounds of the intestines recorded in the works on Military Surgery, clearly prove that many recover from such injuries, although blood, fæcal matter and urine may pass into the cavity of the abdomen, (see p. 271).

I had long supposed that a puncture might be made into the ovarian sac through the vagina, so that the fluid might pass in the erect position,

but I feared that its constant escape might cause irritation, inflammation, ulceration, &c. In a case which I attended with Mr. Hughes, of High Holborn, I proposed this mode of operation in 1836, but he declined it. During the course of four years, the woman was tapped forty-seven times, and 174 gallons of fluid extracted. The operation was required every two or three weeks.

In July, 1840, I was favoured with the facts of the following case by Dr. James Ogden, of Rochdale. A woman of full habit, aged thirty years, the mother of different children, complained of inability to evacuate the bladder. On examination, a tumour was discovered occupying the concavity of the sacrum, pulling down the urethra and rendering catheterism impracticable. The bladder was punctured above the pubes, and two pints of high coloured urine extracted. A futile attempt was made to reintroduce the catheter. An ovarian tumour was detected, and on consultation it was deemed necessary to puncture it with a trocar, and this being done, four quarts of semi-transparent fluid escaped, which gave the patient great relief and restored the action of the bladder. The discharge continued for a month, but gradually diminished, and scarcely soiled the linen at the end of three weeks, and in two months she was quite well, and there was no return of the enlargement. She lived for fourteen years after the operation, and died of pneumonia.

This is a very important case, and one worthy of imitation, especially where tapping is required every two or three weeks.

The diagnosis is easily formed by attending to the history and progress of the disease. In ovarian disease the tumour will be first observed in either groin. There is no thirst, paucity of urine or anasarcaous swelling of either lower extremity for a long time, while these symptoms will precede or accompany ascites or abdominal dropsy. In the latter, the swelling is first observed in the mesial line and is no more on one side than on the other, and the fluctuation is distinctly heard, while often obscure in the former disease. In some cases ascites and ovarian dropsy co-exist, and in such cases there will be a space between the abdominal parietes and the tumour, in which fluctuation is evident. I attended a well marked case of this kind with the late Dr. Uwins, and another with Mr. Whitmore of Coldbath Square, in both of which the above characteristics were distinct. It is worthy of remark, that ovarian dropsy seldom or never occurs during childhood and old age, and usually the pressure of the tumour on the crural nerves and vessels causes numbness and infiltration on the affected side only at first, but on the other when the cyst has acquired a very large size.

The enlarged sac may press upon the bladder, ureters, or kidneys, causing diminution or increase of the urine; but in most cases of this disease, according to my own observation, the quantity of urine and perspiration is considerably diminished. The decrease of both secretions was remarkable in a case which was under my care, in 1836, since which period, the woman has had two children; and she was again similarly affected, in June 1840; and is now, July, free from her disease. In this case, the fluctuation was somewhat obscure, although several medical students felt it distinctly. A very important observation

has been made by MM. Rostan and Cruvelhier in cases of this kind, viz. that in the supine posture in ascites, the floating intestines may impart a certain degree of resonance on percussing the abdomen, which cannot occur in ovarian dropsy, in which the cyst is always situated in front of the abdominal viscera; and for a long time, indeed generally, unconnected with the omentum, which in some cases, covers it.

In fine, diseases of the ovary, may be distinguished from tympanites, obesity, and other abdominal enlargements.

Treatment.—It must be obvious from the preceding account of the pathology, or nature of ovarian dropsy and diseases, that many cases must be incurable, and that little, if any, reliance can be placed upon the remedies formerly advised, such as different baths, compression, or friction of the abdomen, sudorifics, hydragogue purgatives, diuretics, mercurial frictions, &c. I can state, that the preparations of iodine most assuredly effect a cure in some cases, although they fail in many others.

Mr. Abernethy related a case in his lectures, in which the sac burst in the vagina, a large quantity of fluid was discharged, and a cure finally effected. This accords with the result of Dr. Ogden's case already described.

I may here remark, that there is little reliance placed at present, on the use of the muriate of lime, liquor potassæ, or preparations of gold, advised by some few European physicians.

When the accumulation of fluid is considerable, the internal and external use of the iodides of potass, iron, mercury, &c., with elaterium diaphoretics, and diuretics, may be often employed with great advantage; but they frequently fail, and the disease advances, distending the abdomen, impeding the respiration and circulation, requiring the erect posture, preventing locomotion and exertion, and only to be relieved by tapping. This operation may be performed through the abdominal parietes a great many times, but I have been, however, strongly of opinion for years past, that it would be better through the vagina. It has, however, been performed in the former position as many as eighty times. Ford states, that 2786 pints of fluid were extracted, from time to time, in one case; while M. Martineau relates another case, in which, during twenty-five years, 6831 pints were abstracted.

It has recently been proposed to inject the sac through the canula in the same way as in the after treatment of hydrocele; or to introduce a piece of wick, or bougie to cause inflammation, but this method has repeatedly failed and done mischief. It was also suggested to make a large incision through the abdomen as in gastrotomy, (see p. 283), and to extract the tumour, an operation first advised by Vanderhaar, and afterwards by Delaporte, Morand, Siebold, and Logger, and successfully performed by Smith of Connecticut, and Lizars of Edinburgh, (see p. 271), although previously condemned by Morgagni, Sabatier, Murat and others, and now scarcely ever employed. Some eminent physicians and surgeons of the present century have laid open the abdomen, but found ovarian tumours so adherent that they dared not attempt to accomplish their removal; among whom are Lizars, Dieffenbach, Granville, Chrysmers, and others.

It has also been proposed to extract the ovarian sac through the abdominal opening made by the trochar, and this has been done in some cases, and a cure effected; but it must be manifest from the foregoing account of the pathology, that such a proceeding is practicable in a few cases only.

I may here observe, that the celebrated Dr. Mead relates a case, in which eighteen pints of fluid escaped by a rupture of the ovarian sac through the umbilicus; and that Dr. Blundell has recorded the case of a lady, suffering from ovarian dropsy, who fell from her carriage, struck her abdomen against a stone, and who had an abundant flow of urine. She recovered, married, and subsequently died of retroversion of the uterus. It was found, however, on making the autopsy, that the ovarian cyst had burst into the abdominal cavity, in which its contents had been absorbed.

Organic Diseases of the Ovary.—There are numerous disorganizations of the ovary, besides those already noticed, as fibrous and other productions, these blended with the cartilaginous, (Dupuytren), the latter weighing fifty-six pounds, (Caillot); the tuberculous, which may be of a brown or black colour, (Morgagni); and the cancerous which may be scirrhus or cerebriiform.

Dr. Velter describes a case of a tumour, which weighed fifty-six pounds; a fourth of which was cartilaginous, and three-fourths cerebriiform, or brain-like, (Acad. de Med., Juillet, 1825); and in the proceedings of the same institution, a case is recorded, in which the encephaloid substance was still more strongly marked, weighed seventy-five pounds, and also consisted of a fibrous, fleshy, and fatty tissue, (*op. cit.* Sept. 24, 1829.)

It is said, but how correctly I know not, that diseases of the left ovary are more frequent than those of the right. It is likewise on record, that the late Dr. Hooper termed the white tumour of the ovary or uterus cephaloma, and the red hæmatoma; but I need scarcely remind any scholar that both terms may apply to tumours in any part of the body, as well as to those in the pelvic organs, and cannot be exclusively used to distinguish these diseases.

It is however, much more important to state, that Dr. Hooper, whom I was, and am, proud to number among my friends, had observed the latter three times for the once he met with the former.

Scirrhus and Cancer of the Ovary.—This disease may be suspected, but can seldom be recognized during life. The troublesome symptoms which it may excite, are to be removed by ordinary remedies. It is erroneously supposed, that malignant diseases of the ovary, among which are scirrhus and cancer, may be cured, by leeching near the vulva, anus, especially at the return of menstruation, by mercurial or iodated frictions, different baths, mercurial, sulphurous, antimonial and other preparations, such as arsenic and all other poisons, &c., although all these remedies only afford temporary relief, and can never effect a cure.

I must again repeat, that cancer, in whatever part of the body, still remains as incurable as ever, (see p. 398), and is as yet among the *opprobria medicorum*. Such is the result of the observations of the

most learned observant and experienced physicians and surgeons of past and modern times, and indeed no medical practitioner of erudition or experience can doubt them.

It has been proposed to excise or extirpate the orifice or neck of the womb, or to separate the whole organ from its attachments, by means of the knife ; but all experienced obstetricians are now opposed to such proceedings, and estimate them, *pro tanto valeant*, or for as much as they are worth ; for all well know, that such operations have hitherto been failures, no matter by whom performed.

I shall not enter into further particulars, as I do not intend to give pain to any one, but to record a fact, which no learned or experienced obstetrician can question or doubt.

It is as yet, unfortunately too true, that cancer remains, like pulmonary consumption as incurable as ever, whatever empirics or unprincipled men may say or publish to the contrary, for their own base and sordid purposes, and with the sole view of imposing upon a credulous public, and picking their pockets, under the appearance of medical benevolence. I boldly assert, that there is no man living, nor do I believe amongst the dead, who ever cured or could cure cancer, or real pulmonary consumption, and if this position be true, which no experienced and scientific medical practitioner can deny, my readers and their patients can test my statement by their own observations.

Rupture of the Ovary.—M. Duges records a case in which a varicose ovary was ruptured during parturition and caused fatal hæmorrhage. Such cases are of very rare occurrence. Here I may be permitted to inform my junior readers, that loss of blood from any part of the body may be so great as to destroy life.

Diseases of the ovary are often accompanied by intense hysteria, hypochondriasis and melancholy, or complications of two or more of these disorders, a pathological fact which might be expected in diseases of an organ whose function has such great influence upon the uterine system, indeed upon mind and body. I have repeatedly observed excessive nervousness and hysteria in such cases, and sometimes approaching to melancholy or monomania. Such is the unfortunate state of patients, who suffer from enlargement of one or both ovaries, and especially when the enlarged organ or organs make much pressure on the pelvic and abdominal viscera, and greatly derange digestion and the general health.

It now only remains for me to notice the physical lesions and displacements of the ovaries.

Physical Lesions and Displacements of the Ovary.—*Hernia.*—The positions of the ovaries in their ordinary situations, (see plate 4, fig. 1), protect them from external injury, and hence there are few cases of contusions or wounds of these organs on record. Such cases have occurred in consequence of surgical operations, when the ovaries were displaced, and situated immediately under the skin. It is also stated, that empirics have removed these organs from their own daughters to preserve chastity or induce sterility, (see p. 266), an operation frequently performed upon the females of inferior animals.

However incredible it may appear at a first view, the ovary may be

displaced, and present in the form of hernia at the different outlets and most dependent parts of the abdomen and pelvis.

Hernia of the Ovary.—M. Deneux has compiled in a learned essay, all the facts recorded by preceding authors, the substance of which I shall now place before the reader. It appears that ovarian hernia may occur within and without the pelvis. When the ovary is enlarged, it will naturally press downwards from its weight, more especially when the patient is in the erect position, and may cause prolapsus or falling down of the womb; or it may descend between the rectum and vagina, as well as between the latter and the bladder, and cause irritation, inflammation, and ulceration, examples of which are attested by Denman, Sir E. Home, Cruvelheir, Roux, Boivin, Duges, and many other authors. It will be necessary in most cases of this kind, which are obscure and doubtful, to examine externally, and internally, both by the vagina and rectum.

Hernia of the ovary, generally accompanies that of the womb, (see *hysterocele*, p. 385), and presents at the groins and at all the dependent apertures of the pelvis, and when enlarged may, like many other tumours, greatly impede the function of parturition, (see pp. 280-1-2-3-4-5-6).

The ovary may descend alone, with the adjacent uterine tube or a portion of intestine, (Soranus, Bessière), or it may be congested, contain hydatids, or the remains of a blighted foetus, pass through the umbilicus, (Camper), through the ischiatic notch, Camper, Papen, &c.) the crural arch, (Deneux), but most frequently through the crural ring, (Pott, Balin, Lassus, Billard, Deneux, &c., &c.) Lassus and Verdier observed ovarian herniæ in very young persons, and the former as well as M. Billard discovered the disease in newly born infants. Pott described ovarian hernia in each groin somewhat similar to the arrest of the testes of male infants.

Simple ovarian hernia, without enlargement, might be readily discovered by the organ retaining its form, size and mobility; but not so easily when tumefied, inflamed, enlarged, or adherent. It may be distinguished from enterocele and epiplocele by the dragging sensations in the lower part of the abdomen, pelvis, loins and stomach when the patient moves or makes any bodily exertion; but still the diagnosis may be very doubtful in some cases.

Treatment.—Ovarian hernia should be reduced when practicable, but this is not the case when the disease is congenital. The disease may continue for years without any danger, but it is usually the cause of sterility, or ovarian or tubal pregnancy.

Should the hernia become strangulated or painful, excision is the best remedy, and this operation was first successfully performed, I am disposed to think, by Mr. Pott, without either danger or difficulty. The patient became thin, her muscles more prominent than usual, the breasts became smaller, and the menses ceased.

In a case of intestinal and ovarian herniæ, which became strangulated, Lassus enlarged the ring, pushed the ovary a little back to close the aperture, and with the view of preventing the reprotrusion of the intestine.

M. Deneux removed the greater part of the ovary which was distended with hydatids.

Diseases of the Fallopian Tubes.—The most common diseases of the uterine tubes are vices of conformation, inflammation, dropsy, fibrous, encysted and other tumours, and various lesions which can only be discovered on examination after death.

In one case a woman aged about forty years died in a few hours, apparently from loss of blood. On examination of the body after death, the abdomen was distended with blood which proceeded from a rupture of a varicose tumour of the right uterine tube, about the size of an almond.

A similar case is on record, of a woman in the unimpregnated state, who in a violent fit of passion, complained of severe pain in the pelvis, which was rapidly followed by death. On examining the body, the abdomen contained a large quantity of blood, which had proceeded from a rupture of the uterine tube. (*Nouv. Biblioth. Med.* 1823.)

It is however important to state, that such breaches of continuity are most frequent in cases of extra-uterine pregnancy, which are of very rare occurrence.

I may here observe, that the uterine tube has been the source of sanguineous effusion without rupture, as attested by Boivin and Duges in their valuable work so often quoted. They state that this form of disease is most common in the puerperal state, in abortion, or connected with metro-peritonitis.

Vices of Conformation of the Uterine Tubes.—The two uterine tubes like all other parts of the body, whether double or single organs, may be absent, partially or wholly obliterated by inflammation, or destroyed by various other diseases, or disorganizations, as will appear by the succeeding remarks, as well as by many of the preceding observations. It would be unnecessary for me to remark in this place, unless for the information of my junior and unexperienced readers, that inflammation of any organ, and its consequences, are the most frequent causes of diseases. In proof of this statement, I shall proceed to describe inflammation of the Fallopian or uterine tubes, as well as the numerous diseases caused by it.

Inflammation of the Fallopian or Uterine Tube or Tubes.—This disease can scarcely be detected during life, as it is almost invariably complicated with inflammation of the uterus, or its peritoneal or abdominal covering; and when both are combined, the malady is termed, metro-peritonitis. On examination after death, the tube is found red, congested, injected, or filled with blood or pus. In other cases the fimbriated extremity adheres to the ovary or uterus, or the cavity of the whole tube may be obliterated, and incurable sterility induced.

In some cases the ovary is atrophied or annihilated, the fimbriated extremity of the tube may disappear, and the remaining portion become enlarged. A quantity of fluid may accumulate in the tube when both its extremities are obliterated and form tubal dropsy.

De Hean describes a case of hypertrophy of the tube which weighed seven pounds, and contained twenty-three pints of fluid; and in another instance, the tube, ovary, and broad ligament were envolved in a tumour, which contained 112 pints of fluid. (Blancard).

The pathology of tubal dropsy is the same as of ovarian, and conse-

quently a similar mode of treatment is to be employed, and this has been described in a preceding article.

It is also important to state, that the uterine tubes may, in cases of imperforation, be distended with catamenia, blood or pus, and burst in different points, as attested by De Hean and others.

Fibrous Tumours.—M. Bailly describes cases in which he found hard, white, resistant tumours in one of the uterine tubes; and many other morbid growths have been likewise detected by other distinguished authors.

Encysted Tumours.—Morgagni found hydatids, and calcareous productions encysted in the uterine tubes, which separated them from the ovaries.

All these morbid appearances, as well as tuberculous, melanotic, certain leucorrhœal and purulent discharges arise from inflammation at first, and this should be treated as metro-peritonitis or hysteritis, as already described, (see p. 330). When the acute symptoms are subdued the various narcotic injections, as those of belladonna, morphia, sedative solution of opium, hemlock, henbane, &c. may be thrown into the vagina, and often afford much relief. Sedative plaisters of the same ingredients may be applied to the loins with advantage. Every means should likewise be employed to improve the general health.

It must be obvious from the preceding history of the diseases of the uterus, ovaries and tubes, that the remaining appendages of these organs, must be often involved in their numerous diseases; and this is proved by autopsies or anatomical inspections of the parts after death. It is very true that the broad and round ligaments of the uterus may be affected independently of the womb itself, although the whole of the pelvic organs are generally involved in severe cases of inflammation.

Diseases of the Uterine Ligaments.—These parts which are intimately connected with the uterus, (see *plate 4, fig. 1*), may be affected with dropsical and other effusions, to which the terms hydrocele and encysted dropsy have been applied. Such cases are rarely observed unless complicated with other diseases of the uterus, ovaries, or vagina.

The term hydrocele has been applied in women to a serous tumour in the inguinal region, and generally referrible to the sub-pubic ligament. This is of very rare occurrence. Cases, however, have been recorded by Ætius, Paré, Dessault, Palletta, Scarpa; but more particularly by Professor Regnoli, of Pisa, in his very valuable monograph upon the subject, entitled *Intorno l'idrocele delle donne, Pisa, 1832*.

Van den Bosch considers encysted dropsy of the broad ligaments endemical, which I venture to assert is untenable and erroneous. It must be evident to every modern pathologist, that this conclusion must be erroneous. It is indeed incredible and impossible.

It is not proved by the dissertation of Dr. J. J. de Fremery, published at Utrecht in 1819, and entitled *Specimen Medicum Inaugurale de Ligamentorum Uteri, &c. Muctore J. J. de Fremery, &c.*

Encysted Dropsy and Tumours may also exist in the uterine ligaments which are formed by folds of peritoneum, and the diseases may so increase as to become of very considerable size. They are generally

complicated with the ovarian disorganizations, whose pathology and treatment have been fully described in the preceding sections. It must be manifest to the reader who has perused the last two chapters, that the diseases of the internal and external genital organs are very numerous, several of them diminishing or abolishing the reproductive impulse and function, causing sterility, and too many of them incurable, while all may be temporarily relieved. I wish to impress these facts on my junior contemporaries, who too often neglect the careful study of diseases of women, and treat the varied forms of indigestion, nervousness, and hysteria, so frequently symptomatic of them, as idiopathic complaints, and thus mistaking the effect for the cause. According to my own observation and experience, I am certain that most women who suffer from dyspepsia, hypochondriasis after the age of forty years, and sometimes even earlier, are generally affected with some of the numerous maladies peculiar to their organization.

Diseases of the Lactiferous Organs.—I have already stated that lactation is a part of the function of reproduction, and consequently the diseases relative to it must be described in a work of this kind. The mammæ are included among the appendages of the reproductive system, are described with them, and hence the nature and treatment of their diseases must be included in a description of the anatomy, physiology, pathology and treatment of the organs, functions, and diseases peculiar to women.

The diseases of the mammæ and nipples, or those of lactation or suckling are inflammation, suppuration, abscess, ulceration, depraved secretion, excessive, termed polygalactia, absent, agalactia, retention of the milk in the breast, involuntary discharge of the fluid, different alterations of it; as well as nervous affections of the mammæ, spasm, neuralgia, pain, irritable breast, &c.

I have minutely described all these diseases on another occasion, (see *Lectures on Diseases of Women*, already quoted), and shall now briefly notice them in these pages. They are of frequent occurrence, and productive of much pain and inconvenience.

Inflammation of the Mamma.—This disease may be induced by a variety of causes, as the suction of the infant, more especially when its mouth is aphthous or covered with white spots, and also by sudden exposure of the chest to cold. A vast majority of women are exceedingly sensitive after parturition, so that the slightest moral or physical causes will affect them, and frequently excite diseases.

The mammæ and nipples are very liable to inflammation, suppuration, abscess, ulceration, which are seldom prevented by cold applications, leeches, &c., and hence emollient warm fomentations and cataplasms are generally preferred.

These should be freely applied, and the breast rubbed gently with almond or olive oil, while purgatives, diaphoretics, and other antiphlogistics are employed.

But should suppuration happen, which is generally the case, the fomentations and cataplasms ought to be continued, and the abscess opened at the most dependent part, but the pain is usually so great that the sufferer generally allows the matter to escape spontaneously.

When any swelling remains in the breast after suppuration, it ought to be removed by anodyne, mercurial, and iodated embrocations, as it often lays the foundation of scirrhus, cancer, or some other disease. A lady aged seventy years had scirrhus of the breast, which she referred to an inflammation of the organ which occurred after the birth of her first child at the age of twenty-one, since which period there was a small tumour or swelling in the breast. She received a contusion, the part enlarged, and finally became a hideous cancer which destroyed her.

Ulcerations and Fissures of the Nipples cause intense pain whenever the infant is applied, and frequently give rise to inflammation and suppuration of the breast. A great variety of remedies are employed, as almond oil, linseed, mucilage of gum acacia, formerly called gum Arabic, either alone or combined with narcotics. The affected parts are also covered with different cerates, as spermaceti, oxide of zinc, acetate of lead, white precipitate of mercury, cream, fresh butter, butter of cocoa, &c.

The nipple should be covered with a prepared cow's teat, or a shield of some kind whenever the infant is applied, and some almond oil used previously. When any narcotic is mixed with the cerates it should be used in moderation, as it will affect the milk and may injure the infant. It is for this reason that the nipples should be washed with mild soap, and milk and water, before the infant is put to the breast.

Different States of the Milk.—The lacteous secretion is of a white bluish colour, and its taste saccharine. It is sometimes thin, at other times thick, and it may present such differences in the same woman. Nurses of a lymphatic temperament and delicate constitution, and who use spare diet, supply a thin acid milk which affects the infant with griping or diarrhoea. The secretion may be improved in such cases by tonics, nutritious aliment, and all means calculated to restore the general health, as quina, chalybeates, &c. When the breasts appear to suffer from atony, dry frictions and tonic applications should be employed.

Women of full habit, who live well or freely, sometimes secrete the milk so thick, that the infant cannot digest it, and will be affected with vomiting, colic, or diarrhoea. In such cases the nurse should live more sparingly, and take aperient medicine.

In some cases, the milk possesses a yellowish tint and an acid or bitter taste, and is of a bad and unwholesome quality. It is improved by nourishing diet and tonics. It is proper to state, that whatever may be the appearance of the milk, the best proof of its salubrity or insalubrity is the healthful or delicate appearance of the infant. The secretion of milk is modified by moral and physical influences, the passions, food, medicine, state of health or disease of the woman, and also by sexual congress. It may be sparing, absent or superabundant, or flow involuntarily.

Polygalacty—Superabundant Secretion of Milk.—Some women have such a superabundance of milk that they could nourish more than one infant, and the secretion may be profuse from one breast and sparing or suppressed in the other. M. Nauche records a case in which as much as from eight to ten pints were secreted daily, but this rarely happens. The best means of treatment are low diet, purgatives, astrin-

gent local applications, sedatives, both internally and externally. The following liniment is often useful:

R. Aquæ laur. cerasi, ℥ij; ether sulph., ℥j; extract belladonnæ, ʒij. Misce in usum.

Involuntary Discharge of Milk.—In some cases the milk flows involuntarily, wets the dress and causes great inconvenience. The causes are atony or too great a sensibility of the breast.

The indications of treatment are to excite the organ in the first case by gentle frictions or astringent decoction, as that of rhatany, and allow generous diet; and in the second case, narcotics and anodynes are necessary.

Agalaxia—Agalacty—Defect of Milk.—The secretion of milk may be sparing or may be absent. This disease may be caused by want of development or atrophy of the mammary gland, or by the application of astringents to the breasts. It may occur to delicate, nervous, or aged women, who have suffered from chronic disease, or from strong moral causes, excessive discharges, &c.

The breasts are small or badly developed, and sometimes beyond the resources of art.

The best means of treatment are those which improve the general health, and frequent suction of the breast by an adult or with a proper bottle or syringe; and blood may also be determined to it by the frequent use of dry cupping, or by the application of a leech or two to each breast, two or three times a week.

Retention of Milk in the Breast.—When the nipple is very small, or so large that the infant cannot seize it, or when it is imperforate, or the breast affected with spasm or inflammation, the milk will distend the organ and cause pain and inflammation, unless preventive means are employed.

Treatment.—Suction should be employed, and anodyne fomentations and embrocations when the breast is distended. Purgatives, diaphoretics and low diet will be necessary until the healthful state of the secretion is established.

Inflammation and spasm are to be treated by antiphlogistics and narcotics. When the nipples are imperforate, or affected with other vices of conformation, the disease is often incurable.

Mastodynia—Spasm of the Breast may be caused by a sudden suppression or increase of the lacteous secretion, and often attacks nervous, hysterical and delicate women. It comes on suddenly, and continues only for a short time. It may be induced by mental emotions.

It is speedily relieved by warm anodyne fomentations or embrocations, and in severe cases antispasmodics and narcotics will be required. The same treatment will be necessary in cases of irritable mamma, or neuralgia, which I have termed mastoneuralgia.

Vices of Conformation of the Nipple.—The vices of conformation of the nipple are flatness, imperforation, absence and multiplicity. It often happens that women find it difficult to nurse their infants when the nipples are flat, hard and not sufficiently developed, in consequence of natural defect, or of the pressure made by tight lacing.

In such cases, different cerates, almond oil, fresh butter, &c. are

applied, and suction frequently made with a proper glass, or breast pump, while the part may be gently drawn out, and titillated, three or four times a day. These means should be persevered in to prevent distention and inflammation of the breast.

It rarely happens that the nipple is imperforate, although its ducts may be obstructed by the milk after delivery, and in some cases by spasm. In these cases the above remedies will generally afford relief. Absence of the nipples is exceedingly rare, though tuberculous growths are sometimes observed, as well as a multiplicity of parts, and cases are recorded in which there were said to be two or three nipples on one breast. I think it more likely that such adventitious parts were excrescences, tubercles, or vegetations; and I may here observe that when such exist, they may be removed with a scissors or by ligatures, in accordance with the established principles of surgery.

Fissures and Excoriations of the Nipple.—When the nipple is short and the infant is obliged to make several attempts to suck it, so much irritation is produced, that the part becomes inflamed, excoriated, and chapped. In such cases the affected part should be covered with simple cerate, or rubbed with mucilage, olive or almond oil, and exposure to the air, after the infant is removed should be avoided, as also the pressure of the clothes. Anodyne fomentations, as decoction of poppy heads, chamomile, marsh-mallows, or linseed, or a cataplasm, made of bread steeped in these fluids, may be applied three or more times a day. Should these means fail, after due attention to the regularity of the bowels, the disease may advance and chaps or fissures be formed. These consist of cracks at the base, and sometimes extending round the whole nipple. The suction of the infant causes severe or intolerable pain, and if persisted in, extension of the ulceration, falling off of the nipple, and sometimes inflammation of the breast.

In such cases the woman should apply the infant to the sound breast, and distention of the affected one should be further prevented by warm anodyne fomentations and repeated suction. Lotions of zinc, lead combined with opium or other narcotics, may be applied with benefit, and the nipple covered with a shield of some kind during suction.

Venereal Ulcers of the Nipple are easily distinguished by their characteristic appearances, and by their obstinacy in yielding to the remedies just enumerated. The infant's mouth is generally affected, or if born with syphilis may become so after birth. Every infant applied to the breast will become infected, and these again infect every breast to which they are applied. The late Mr. Hey of Leeds has recorded some cases which were extensively spread in this manner.

The usual treatment will be required in such cases, and the remedies taken by the mother will generally cure the infant through the breast milk, unless in bad cases; and then mercurial pill or chalk with mercury must be given to the latter.

Besides the diseases of the organs of lactation hitherto described, there are some others, such as vices of conformation, scirrhus, cancer and encysted tumours of the mamma which are consigned to surgery, and need not be minutely considered in a work almost exclusively devoted to obstetric medicine, as they are treated upon fixed principles.

I shall only remark, in conclusion, that I have succeeded in different cases in causing the absorption, and effecting a cure of scirrhusities of the breast, which were doomed to the knife; a most remarkable case of the disease in both *mammæ* with enlargement of the sub-axillary glands was cured by the iodide of potass used both internally and externally. Several contemporaries and medical students saw this case in the autumn of 1839, while under my care at the Metropolitan Free Hospital, and were highly pleased at the result. Ample experience and observation have convinced me of the inestimable value of the preparations of iodine, when genuine, in a vast number of glandular and hypertrophic enlargements of the different tissues of the body, even bone included, as in white swelling of the knee, or rather enlargement of the bones which form it, as well as of those of the elbows, wrists, ankles, &c.

Let any practitioner of medicine try the genuine preparations of iodine, which I regret to observe are seldom to be procured in this metropolis, unless from the most respectable houses, and observe for himself, and I am convinced he will, however sceptical, be compelled to admit the correctness of my statements.

I beg here to remark, that I never praise any medicine, no matter how highly it may be recommended, until I have repeatedly observed its effects in numerous cases; and I am compelled to make these remarks, as many decry the preparations of iodine, (which in my humble opinion are among the most valuable remedies in use), because they have not used them genuine.

I must likewise remark, that I am physician to a public institution, in which I see nearly four hundred patients a week, and for many of whom, according to my judgment, I prescribe the different preparations of iodine as recommended by the most experienced of all its advocates, M. Lugol of Paris. If I follow his example, and attest almost all, I should say all,—if my observations were equally extensive as his at the splendid and unequalled hospital of St. Louis for cutaneous diseases, at which I had the good fortune to be the pupil or *élève* of the celebrated Baron Alibert, my patron and master, and the most distinguished author on diseases of the skin in his country of his day,—I cannot help it, if some of my contemporaries, placed in false positions, chose to decry a most valuable class of medicines, which I could prove they have never fairly tried on the extensive scale as at the splendid hospital I have named, as yet unequalled, I grieve to indite it, but it is the truth, by any similar charity in this kingdom.

There are numerous cutaneous diseases, perhaps some hundreds, if not thousands in different stages, and as yet with all our public charities, (and there is not a nation on earth which has so many,) we have not exclusively devoted one to this class of infirmities.

CHAPTER III.

ENCYONOSLOGY—DISEASES OF PREGNANCY.

ALTHOUGH pregnancy is a natural function, it frequently excites considerable derangements in the organs of the body. These morbid sensations are considered signs of conception in the first weeks of gestation, but soon become so troublesome, as to be actual disorders. The new action which takes place in the womb, and its appendages, is a cause of excitement, which extends to all the organs which have much sympathy with the affected parts, indeed to every portion of the body. It is an axiom in physiology, that the womb and stomach have a strong sympathy; and that the latter strongly sympathises with the brain and nervous system; and through these with every organ in the body.

The cerebro-spinal system of nerves very clearly accounts for this universal sympathy between all parts of the body.

The sympathy between the womb and stomach is great; and hence we so often observe nausea, vomiting, heartburn, loss of appetite, indigestion, arise after conception, and these are considered symptomatic of this condition.

The breasts are also intimately connected by sympathy with the womb, and therefore become sensitive and enlarged after pregnancy—states strongly indicative of the latter condition.

The irritation of the stomach will speedily affect the brain, and hence we find slight pain in the head, dizziness, drowsiness, convulsions, palsy, toothache, dimness of the sight, impaired hearing, and deranged condition of the tongue, are often induced by pregnancy.

The functions of respiration and circulation are also deranged, as will appear hereafter.

The gravid uterus will also affect the intestinal canal, cause diarrhoea or costiveness; will affect the rectum and bladder, and often induce strangury, heat or pain in passing water, and tenesmus or straining of the lower intestine. These sympathetic actions occur soon after conception, continue till quickening, and gradually abate and disappear in general, towards the latter months of pregnancy. They sometimes, however, continue to the end of gestation.

It is a popular observation, confirmed by experience, that women who are most sick, are the most unlikely to miscarry, although emetics are sometimes fruitlessly given to cause abortion.

It appears from what has been already stated, that conception is followed by considerable changes in both mind and body.

The pregnant woman is more easily excited, and more susceptible of impressions.

The vascular and nervous systems become excited; and consequently all stimulants should be avoided.

The diseases of the pregnant state may be referred to the increased sensibility of the nervous, and derangement of the vascular systems, or to pressure of the impregnated womb on the pelvic and abdominal organs.

Some women have better health during pregnancy than at any other time; while others suffer severely to the moment of their delivery.

The diseases of pregnancy may be divided for practical purposes into those of the early, and those of the latter months. The first class comprehends affections of the stomach, as nausea, vomiting, indigestion, heartburn, and water-brash. The diseases of the latter months of pregnancy, or second class, are, a febrile state, costiveness, collections of fæces in the bowels, piles, spasm of the stomach and duodenum, jaundice, gripings, dysentery, tenesmus, diarrhœa; heat and pain in evacuating the bladder, incontinence of urine, various affections of the bladder; spasm of the ureter and uterus, cramps, numbness, and other unpleasant sensations of the lower extremities; varices of the legs, thighs, and abdomen, œdema, or dropsical swelling of the legs; disorders of the brain, as want of sleep, solicitude, anxiety and despondency, headache, toothache, drowsiness, vertigo or giddiness; disorders of respiration and circulation, as cough, difficult breathing, palpitation, spitting of blood; diseases of the abdomen, as dropsy, ascites, inflammation, flatulence, distention of the abdomen, pendulous abdomen; diseases of the genital organs, venereal disease, pruritus, or intolerable itching, fluor albus; descent, retroversion, anteversion, and obliquities of the womb, abortion, flooding or uterine hæmorrhage, and false pains, &c.; of the greater number of which I have treated already in the preceding pages.

I shall now proceed to enumerate, from my syllabus of a course of lectures on andrology, gynæcology, and pædonosology, popularly termed midwifery and diseases of women and children, the principal diseases which occur during pregnancy, arranged according to the physiological systems; and afterwards describe them according to the frequency of their occurrence.

Here I must premise, that all these diseases, are to be treated upon ordinary principles, but not so actively, unless the life of the woman, or infant is endangered.

All active remedies, such as general bleeding, cupping, surgical operations, purgatives, emetics, narcotics, mercurials, and indeed all active remedies, must be used with more circumspection, than when the woman is in the unimpregnated state.

It is well known to every experienced physician and obstetrician, that all remedies, operations, articles of diet, indeed all moral and physical influences, affect, to a greater or less degree, the foetus in womb, and if urged too far, predispose to abortion, or premature labour, both of which are generally dangerous, and very often fatal diseases, (see p. 310).

The following are the principal diseases of women, in relation to generation:—accidents of conception; impotence and sterility; depraved conception; extra-uterine conception; abdominal pregnancy; *afœtal*, *bigeminal*; *complex*, two foetuses one within the other; *complicated*, a foetus with an abdominal production, as fluid, hydatids polypus; *compound*, several foetuses in the womb at the same time; *false*, from the increase of the size of the uterus or its appendages, not caused by a foetus in the uterine cavity; *gazo-hysterical*, false pregnancy produced by gas in the cavity of the uterus; *hæmato-hysterical*, from blood in the

uterine cavity; *ovarian* pregnancy, in which the foetus is developed in the substance of the ovary; *sarco-fœtal*, pregnancy of one or more foetuses complicated with moles; *sarco-hysteric*, pregnancy formed by a mole or false germ; *trigeminal*, pregnancy in which three foetuses are developed in the womb, simultaneously; *tubal*, pregnancy in which the foetus is developed in the uterine tube: *utero-abdominal*, pregnancy formed by two foetuses, one developed in the womb, and the other in the cavity of the abdomen or peritoneum; *utero-ovarian*, one foetus in the womb, and another in the ovary; *utero-tubal*, one foetus in the uterus, and the other in the uterine or Fallopian tube.

Diseases relative to Pregnancy.—1. Idiopathic diseases of the womb; abortion, miscarriage, and premature parturition. 2. Sympathetic disorders and diseases dependent on the influence of the womb on the different functions of the body.

1. *Disorders of the Digestive Organs* during utero-gestation or pregnancy.—Anorexia, nausea, or “morning sickness,” depraved appetite; vomiting; epigastric pain, or gastrodynia; pyrosis, or waterbrash; pyalism, or salivation; odontalgia, or toothache; secretion of gas, or flatulency in the stomach and intestines, causing spasms, acute pains, or colic; constipation, or costiveness; diarrhœa; dysentery; tenesmus; retention, or incontinence of urine; different kinds of hernia; hæmorrhoids, or piles; hæmatemesis, or vomiting of blood; cholera.

2. *Disorders affecting the Organs of Respiration* during Pregnancy.—Dyspnœa, catarrh, spasmodic cough, hæmoptysis or spitting of blood, pleuritis, bronchitis, pneumonia, phthisis and other diseases of the lungs.

3. *Disorders of the Circulation* during Pregnancy.—Palpitations and irregularities of the hearts’ action; syncope, or fainting; general plethora; hæmorrhages from the nose (epistaxis), rectum (piles), varicose veins in the inferior extremities, labia pudendi, veins of the external surface of the abdomen; anasarca; dropsy of serous membranes, ascites; hydrothorax.

4. *Disorders of the Cerebro-Spinal Apparatus* during Pregnancy.—Exhilaration or depression of spirits; insomnia, agrypnia or want of sleep; cephalalgia or headache, or various unnatural sensations in the head; convulsions; ophthalmic, acoustic, olfactive, neuroses, or nervous pains, ophthalmia, otalgia, &c.; various neuralgiæ or painful sensations along the spine, sides, loins, hips, groins, genital organs, and different parts of the body.

The pressure of the enlarging uterus on the sacral nerves and blood-vessels, and on the rectum, vagina and bladder, deranges all these parts, and causes many diseases of them, as well as of the inferior extremities.

5. The chief diseases of the genito-urinary organs have been already described, as well as

6. Those of locomotion. I shall now describe the diseases of pregnancy according to their frequency, as met with in practice, and they may be readily placed in the preceding classes, by all educated and experienced medical observers.

Women are subject during pregnancy, to diseases in the head, chest, abdomen, and most other parts of the body, and these are to be treated

upon ordinary principles, with the exception that severe remedies are to be used with caution for the reasons already stated.

I have, in another work, described the different medical diseases which come under the care of the physician, and practitioner, and shall now confine myself to general comment on the disorders and maladies which most commonly occur to pregnant women. The reader will find a minute account of them in the *Physician's Vademecum, or Manual of the Practice of Medicine*, 11th edition, 1837, of which work 20,000 copies have been disposed of since its first appearance.

I shall now proceed to comment upon the most frequent diseases of women during pregnancy, and avoid giving prescriptions in a great measure, as unnecessary to the majority of modern practitioners, and of little use to those general readers who may peruse these pages.

Digestion—The *appetite and taste* are deranged by pregnancy, and the vulgar attach great importance to the gratification of these different tastes; but they are only to be gratified when nutritious food is desired, and not when resulting from caprice, or a depraved palate.

A voracious appetite may be gratified by a proper quantity of food, not given to satiety; a variable appetite may be satisfied by frequent light repasts; and a diminished appetite by that food the woman may desire.

All strong liquors are to be avoided; as they excite the vascular and nervous systems. The diet should be nutritious, and easy of digestion, and not increased on account of the infant. All powerful, mental, and bodily exertions are to be avoided as much as possible; but regular and moderate exercise on foot or otherwise may be used, with advantage.

Nausea and vomiting, are among the first disorders of pregnancy, though the appetite is vigorous; and the sickness is more troublesome in the morning, when the woman assumes the erect posture, as the enlarged womb presses downwards, causes irritation, and sympathetic action. It is popularly termed, "morning sickness."

The *best treatment* for nausea and vomiting, is the effervescing draught with tincture of opium, in the proportion of six ounces of the first, and one drachm of the second. The various sedative preparations of opium, as morphia, sedative liquor, or solid opium, are used with advantage. Opiate frictions to the stomach will often succeed, when every other remedy fails. I have also used an opiate plaister, or other sedative with advantage. The tincture of soap and opium, with an additional quantity of the latter, may be rubbed on the stomach frequently, during the day. Cold water alone will sometimes procure relief. Dr. Dewees, found twenty drops of oil of turpentine in a glass of water, two or three times a-day, succeed, when every thing else had failed. The turpentine might be mixed in the form of emulsion, and sweetened with honey. This vomiting seldom causes abortion, and yet artificial vomiting often does. It sometimes continues during the whole period of pregnancy, in despite of all remedies. Drs. Sims and Lorenzt applied leeches over the stomach with success; others recommend blisters. "In some bad cases," Dr. Conquest states that "premature labour must be effected artificially, as essential to the safety of such women." I have never met

with a case which required it. Vegetable bitters, as infusion of calumba with soda, may be given in a state of effervescence; but if the vomiting be unrelieved, it may be necessary to support the strength, by nutritious clysters. Burns strongly recommends blood-letting in preference to all other remedies in cases of vomiting, and says all other remedies may fail without it.

I have repeatedly known all the above remedies fail, and even the patient to vomit blood, yet obtain relief after all medicines had been laid aside, and the woman even bring forth a perfectly healthful infant. In one case the patient was robust, and in another delicate, yet both suffered from vomiting from the third to the end of the ninth month of pregnancy, and yet brought forth remarkably healthful infants, and both had several children afterwards without any recurrence of the disease. In both cases belladonna, opiate and hemlock plaisters, were applied over the stomach as well as over the opposite portion of the spine, without effect; and then leeches, blisters, and narcotic remedies, used endermically with the same results. Such cases are, however, of rare occurrence, as nausea and vomiting usually cease at the third, fourth, or fifth month and a half of pregnancy, when quickening generally occurs. Baron Alibert has also well observed, that the vomiting is often periodical, and a precursor of convulsions, and that most women do not suffer from it after the first pregnancy, though there are some exceptions.

Depraved Appetite, Indigestion, Waterbrash, and Acidity of the Stomach, are to be relieved in the usual manner. Bitter infusions, with soda, potass, or liquor of pure ammonia; liquor calcis (six ounces), liquor of potass, (two drachms); a table spoonful frequently in the day have been used with advantage, (see p. 432).

Duges informs us, that chronic gastritis may arise during pregnancy, from the state of the stomach under consideration. This must be a very rare occurrence. The bowels are to be regulated by the form of medicine mentioned for costiveness. Lime-water mixed with milk and calcined magnesia, a quarter of each of the two first, and a tea-spoonful of the last, might be given in acidity, with the greatest benefit. Baillie found the mineral acids of more use in this complaint than the alkalies; while Dewees prefers vegetable acids, as lemon juice. One lady took a dozen of lemons daily, and no other food or drink. He also advises clove tea, as almost infallible: twenty cloves to be infused in half a pint of boiling water. These disorders may be more urgent during the first, than in any subsequent pregnancy, and, vomiting has been more severe when the woman carried a male than a female. Although it may continue the whole time to delivery, the infant is generally healthful.

This disease has also been termed *Pica—Malacia—Heterorexia*.—Some women desire to take as food many innutritious substances, such as charcoal, chalk, lime, earths, pitch, calcined bones, ashes, cobwebs, pins and needles, &c.

As this statement may appear questionable to some of my readers, I shall attest it by the most respectable evidence.

Professor Capuron of Paris, still a living witness, mentions the case

of a pregnant woman, who actually wished to eat the shoulder of a baker which she had seen uncovered. Another wished to eat of the flesh of her husband, and thought of assassinating him for the purpose.

Professor Hatin of Paris, another living witness, records the case of a woman, who consumed large quantities of salt and vinegar; as well as that of another who extracted a large quantity of bones which had been thrown into the fire, and ate them without the slightest inconvenience.

The late Baron Alibert records the following most extraordinary case in his valuable *Nosology*. A young woman at Grenoble, swallowed large quantities of pins and needles, and some of these passed through her arms, fore-arms, thighs, and legs. As many as fourteen or fifteen hundred were found in the stomach. A vast number was detected in the walls of the vagina after death, which part was sent to Paris by M. Silvy, and examined by my revered master and friend, Baron Alibert.

Most primiparous women have a great objection to any kind of animal food, and some of them suffer from nausea at the dinner table, though on a future pregnancy they can take it as usual. Some consume a vast quantity of table salt, vinegar, onions, fruits, uncooked peas, beans, &c. &c.

M. Capuron relates the case of a woman who ate fourteen hundred salt herrings, with impunity, during her pregnancy; and that of another, who swallowed two pounds of chalk at once, without any inconvenience. Dr. Smollet's ludicrous catalogue of longings mainly contributed to cure most women of them in all countries.

Cardialgia, or Heartburn, is often a troublesome affection. The sensation of heat proceeds from the stomach to the throat, and is extremely unpleasant. The alkalies, as soda, potass, effervescing draughts, lime-water, chalk, may or may not afford relief. Dewees had a patient who lived nearly on chalk during pregnancy. She used three pecks and a half. She became as white as the substance itself, and prematurely sunk from her disease. He recommends aperient pills, each or every other night. Sims and Denman praise the following mixture:—℞. Aquæ destillatæ, ℥v; liquoris ammoniæ, magnesiæ calcin., āā 3j; aq. cinnamomi, ℥j. Misce, sumat cochlearia duo ampla sæpe in die.

I have found the following mixture of great service:—℞. Liquoris calcis, ℥vj; tincturæ opii, 3j; liquoris potassæ, 3ij; mag. calcin. 3j. Misce. Dosis cochleare amplum ex poculo jusculi bovini vel lactis, ter in die.

Gardien and many others have found great benefit from bismuth in small doses, in gastralgia, pyrosis, gastro-enteralgia, chronic gastritis, cramp of the stomach, diarrhœa, vomiting, &c. It may be used as follows:—From ten to sixty grains in twenty-four hours in pills, sugar and water or mucilage.

℞ Bismuthi trisnitratis, 3j; pulv. tragacanthæ c., 3ij. Misce, et dentur grana x. ad xx. bis terve in die. (See Dr. Ryan's *Universal Pharmacopœia, or Formulary of Hospitals*, 3rd edition, 1839).

In some cases leeches and a blister to the epigastric region will afford relief.

Pyrosis, or Water-brash, will be relieved or removed by the second or third prescription, when the fluid is acid; but should it be alkaline or insipid, the mineral acids must be employed. These conditions often alternate, and will require a change of remedies. We are indebted to Dr. James Johnson for the discovery of this fact, which clearly explains why alkalies succeed in some cases, and acids in others. (*Essay on Morbid Sensibility of the Stomach*, 1831).

In some cases neither acids nor alkalies will be of any use, and the improvement of the general health must be attended to, and when effected, a cure will be accomplished.

Ptyalism, or Salivation is sometimes a troublesome disease during pregnancy. The quantity of saliva discharged daily has amounted to three or four pints, without any connexion with disorder of the stomach. I have seen a remarkable instance of this kind with the late Mr. Woodhouse, of Ilford, and it continued in despite of all remedies, for four months. Gargles of the chlorides of lime and soda produced no effect. Dr. Fahnestock, of Pennsylvania, recommends an infusion of the inner bark of the *rhus glabrum* or sumach, as the best remedy, and also in the ulceration of the tongue, mouth, and fauces. (*London Med. & Surg. Journ.* 1830, vol. iv.)

Dr. Geddings, of Charleston, has found the following remedy generally efficacious:—℞. Mucilaginis acaciæ, ℥viij; olei terebinthinæ, ʒij. Misce. Usurpetur pro gargarismate, frequenter in die.

Gargles of the chlorides of lime and soda, combined with mucilage and opium, often afford relief.

℞. Solutionis calcis chloridi, ʒj; aquæ ℥vj; mist. acaciæ, syrupi simplicis, āā ʒj; liq. opii, vel morphinæ mur., ʒj. Fiat gargarisma, ter quaterve in die usurpandum.

There is sometimes a *febrile state* which deprives the woman of sleep, causes debility, emaciation, and sharpening of the features. It is relieved by the usual treatment, saline aperients, effervescing draughts, and blood-letting. We should procure sleep by the sedative preparations of opium, although Burns is opposed to the practice. He asserts that a continued use of opium injures the stomach and bowels, and likewise the infant.

There is a *remittent fever* consequent to pregnancy, which arises from irregularity of the bowels. It is cured by removing the cause.

Spasm of the Stomach or Duodenum is often very severe, and if allowed to continue for any time, may destroy the infant.

The warm carminative tinctures, as those of cardamoms, rhubarb, senna, with free doses of opium and ether, in general procure immediate relief. The following mixture is very efficacious in this disease, in the different forms of indigestion, hypochondriasis, and various other disorders, or in those neuropathic affections, in which the patient complains of all sorts of pains and aches in every part of the body, or, de omnibus morbis, et quibusdam aliis.

℞. Aquæ menthæ pip., Oj; rhei pulv., ʒj; mag. calcin., ʒiss; zingiberis pulv., ʒj; tinct. capsici, tinc. opii, sp. ether. sulph. āā, ʒj. Dosis cochleare amplum ter, quaterve in die. (See *Universal Pharmacopœia*, 3rd edition, 1839, by the author.)

The first four ingredients were prescribed by the late celebrated Professor Gregory of Edinburgh, the author of the *Conspectus Medicinæ*, and the rest by myself. I can positively state, from much experience, that the above is a most valuable medicine in the cases under notice, either complicated with hysteria, hypochondriasis or melancholy, and I use it with the best effects in a large number of such cases every week, in the presence of numerous students who attend the medical or physicians' practice at the Metropolitan Free Hospital, Carey Street, Lincoln's Inn Fields. If the head is affected, convulsions may set in, unless blood-letting be employed. The bowels are to be kept regular, and blood-letting employed in bad cases.

Constipation.—*Costiveness* is one of the most common diseases of pregnancy; it arises from torpor of the bowels, caused by the pressure of the enlarged womb. The bowels ought to be kept regular by mild subacid fruits or proper diet, and if these fail, manna, magnesia, Epsom salt, castor oil, confection of senna or the old lenitive electuary, are the best remedies. Dr. Hamilton's formula for costiveness, was—
℞. Extract. colocynth. comp., ℥ij; extracti hyoscyami, ℥j. In pilulas xv divide, ex his capiat ægra, unam vel duas, pro re natâ.

A few grains of calomel, or pil. hyd. as ℥ss, may be added, when the liver is disordered.

To this formula I add four minims of oil of peppermint, or some other essential oil, and half a scruple of calomel or mercurial pill, should the function of the liver be deranged; a grain of strychnia may be added, when there is much hysteria or nervousness. The compound rhubarb and aloetic pills are advised by Burns in proper doses, but I consider them objectionable.

The colon and rectum may become distended to an enormous degree with indurated fæces. In such cases, there will be severe cutting pain or tormina, very urgent desire to evacuate the bowels or tenesmus; and mucus, or pure blood will be discharged. When ordinary medicines fail, some mechanical means must be resorted to, to break down the fæces, as recommended by Denman and Scarpa. There is a peculiar instrument for this purpose. Laxatives are to be given as soon as the bowels are relieved. If there is great pain, blood-letting must be resorted to, lest inflammation of the bowels supervene.

The French obviate costiveness by a daily use of lavements or clysters.

Diarhœa, or bowel complaint, may arise from relaxation, or an accumulation of fæces. Astringents with opium, and flannel rollers, are to be employed in the first form; and mild laxatives in the latter. Tenesmus and dysentery are best relieved by opiates alone, or combined with the acet. plumbi.

℞. Plumbi diacetatis gr. viij—xx; acidi acetici diluti, ʒj; aquæ menthæ pip., ʒv, liq. opii, vel morphinæ sol. mur., ʒj; syrupi simplicis ʒj.

Dosis cochleare amplum post singulas sedes liquidas.

This remedy will generally succeed in ordinary or severe cases of diarrhœa or dysentery, but when it fails, the following will be effectual in most, but necessarily not in all cases accompanied by nervousness,

hysteria or spasm, as in common English, and frequently in malignant blue cholera, (see Dr. Ryan's *Physician's Vademecum*, 1837, and his *Universal Pharmacopœia of Hospitals*, 1839):—

℞. Cupri sulphatis, gr. ij; opii pulv., gr. ij—iij; confect. rosæ, ℥ij; strychniæ pulv., gr. j. Tere intime et in pilulas xv divide, ex quibus capiat unam singulis, secundis vel tertiis horis, pro ut urgeant symptomata.

I have been astonished at the sudden and good effects of these pills in the majority of cases of the above named diseases; but they often fail, as there are some cases perfectly incurable.

The persesquinitrate of iron is also a valuable remedy.

Hemorrhoids or piles arise from the pressure of the gravid womb, which prevents the free return of the venous blood to the heart. The best cure for piles is the regulation of the bowels by mild laxatives, as small doses of neutral salts, castor oil, or the electuary of sulphur, and cream of tartar. When the bowels have been regulated, the astringent lotions, and ointments in common use, may be applied—as solutions of acetate of lead, alum and oak bark, and gall ointment. The gall ointment with opium or belladonna, generally affords relief. Should this fail, an anodyne enema composed of three ounces of starch mucilage, and half a drachm of laudanum, will often succeed. The introduction of simple cerate, or combined with a grain or two of the watery extract of opium into the rectum, mitigates the present suffering. Fresh butter, lard, or suet may be used in the same manner. When piles are strangulated by the sphincter ani, warm fomentations, hip-baths, and warm poultices, will facilitate reduction. The daily application of cold water in slight cases of this kind will be used with much benefit. The introduction of a piece of common candle into the rectum is also a very valuable remedy, it lubricates and cools the part. Each pile may be squeezed between the finger and thumb, and returned into the rectum. Dr. Hamilton has seen them excised during pregnancy. Dr. Kirby, of Dublin, advocates the operation; while Sir Astley Cooper thinks it most dangerous. The irritation caused by piles has produced abortion. The French apply leeches to the anus; but in this country females are generally averse to them.

Colic, or Spasm of the Intestine, is a common disease of pregnancy. Colic is defined—"pain in the abdomen, with sense of twisting round the navel, vomiting, costiveness, spasms of the abdominal muscles, and sometimes retraction of the navel." It arises from spasm, accumulation of fæces in the bowels, cold, flatulency, and biliary calculi.

Mild aperients, laxative clysters, opiate frictions to the abdomen, when spasm prevails, are the best remedies. Blood-letting, warm bathing, fomentations, leeches and blisters, must sometimes be employed.

Jaundice sometimes occurs during pregnancy. Small doses of calomel, with saline medicines, next day, generally remove it. The pills prescribed for costiveness, with calomel, are generally effectual. Emetics, or violent purges, ought to be avoided. When the disease occurs in the last months of pregnancy, it proceeds from pressure on the gall ducts, by the enlarged womb, and will not disappear until after delivery.

Other discolorations appear on the face and surface of the body, and

of various colours, dark brown, greenish, or yellow. Aperients remove them, and they are of no consequence.

It would be foreign to the nature of these pages to enter upon a physiological disquisition relative to the importance of digestion, as regards the human body, and more particularly as Dr. Coombes's justly celebrated popular work on the subject, which is almost in every respectable family, obviates the necessity; and I shall therefore merely observe, that a certain part of the food taken into the stomach is prepared or digested, to be converted into blood, in the lungs, which fluid is to be conveyed to the heart, and to be circulated throughout the body, for the nourishment of every part, as first explained and proved by our fellow-countryman, the ill-used, though immortal HARVEY. It is to be however observed, that a large portion of human food, and what an immense variety there is of it, is not converted into blood or nutriment, passes through the stomach into the intestines, commonly called bowels, undergoes certain changes, and ought to be daily expelled from the body, for the same reason that food must be taken daily. If not expelled daily, or frequently, the useless, or excrementitious part of it will accumulate in some portion of the intestinal canal, or bowels, and may cause all the derangements in the other sex, which I am about to describe in pregnant women; and hence the axiom or universal medical precept that the bowels ought to act daily, to secure health; and that their evacuation should be spontaneous, or artificial. No one would think of pouring wine into a hogshead without first removing the dregs of the former fluid, and purifying the vessel; no one would allow the dregs to accumulate, who could remove them.

I shall not here enter into the varied causes of costiveness, as I have fully described them in another work, *The Physician's Vademecum*, 11th edition, 1837, already quoted, further than to notice one peculiar to pregnant women, and that is, the compression of the womb during the growth of the foetus or infant, as pregnancy advances, upon the large intestines, more especially in the last months of gestation, and hence the absolute necessity of daily regulating the bowels by proper medicines, such as those already advised, (see p. 339,) which acting on the liver, exciting the secretion of bile, the natural stimulant of the bowels, secure the object in view.

A vast number of the disorders and diseases of pregnant women are to be prevented by a daily evacuation of the bowels, either without or with the use of medicines.

The late Professor Hamilton, of Edinburgh, most energetically enforced this precept, in his lectures on Midwifery, and Diseases of Women and Children, for many years before Mr. Abernethy appeared, as one of the most eminent surgeons of the age in which he lived. Every properly educated physician and surgeon, who has studied obstetric medicine in modern times, and I grieve to indite that the larger number have not, must admit, even upon general grounds, the correctness of Professor Hamilton's conclusion. Surely, if a dose of Epsom, Glauber or Rochelle salts, or a blue (mercurial) pill, and black (purgative) draught, are cures for all diseases, as so generally imagined not only by the public but the greater part of the medical profession in all civilized countries

in this age, it must be admitted, that the daily evacuation of the digestive organs, or bowels, to use the popular term, is as essential to pregnant women, as well as to all other classes of society.

Dr. Hamilton was wont to inculcate in his valuable, and truly practical lectures on Midwifery, and Diseases of Women and Children, that a vast number of diseases incidental to women during pregnancy, were prevented by the daily regulation of the bowels, spontaneously, or by whatever means; that the health and strength of the woman, were preserved and secured thereby, and if any operation were necessary, the woman would be better able to bear it, than if her health was injured by costiveness; that she would have a speedy recovery from childbed, and that her infant would be healthful, and most likely to do well. A careful observation and experience of twenty years, have enabled me to arrive at similar conclusions; and I take the liberty of recommending these conclusions to every obstetric medical practitioner, indeed to every student, or general reader, who may by chance happen to peruse these pages.

Lastly, I must observe, that no human being can be in perfect health, whose digestive system, or intestinal canal is not evacuated daily.

Women suffer much more from costiveness than those of the other sex, in consequence of their inactive and sedentary habits, indeed most of the former, in the middle and upper classes of life, have a proper action, or daily evacuation of the bowels. This is a fact known to every observant and experienced medical practitioner, but the disease (costiveness) is greatly increased during the advance of pregnancy, by the pressure of the enlarging womb and infant on the lower intestines, which render these parts torpid, or insensible, obstruct the return of the blood from the lower limbs, cause swelling, enlarged veins, or dropsy of these parts, or piles, irritable bladder, difficult respiration, disordered action of the heart, headache, derangements of vision, hearing, taste, smell, as well as disorders in every part of the body.

The records of obstetric medicine afford abundant evidence of the truth of the preceding statements, of which I shall indite only a few examples.

Some women remain eight days, others twenty or thirty, without an alvine evacuation. MM. Capuron, Pelletan, and Dubois were consulted in the case of a lady who had been three months constipated.

The bad effects of long continued costiveness are numerous, as I have already mentioned, among which are headache, colic, loss of appetite, sense of weight in the abdomen; while the repeated and fruitless efforts and straining to evacuate the bowels may derange the brain, lungs, heart, and often induce abortion, (see p. 307).

Among the diseases arising from this cause is a most troublesome and almost incessant desire and straining to evacuate the bowels, technically termed *tenesmus*.

Tenesmus.—This term is applied to a constant or frequent and fruitless desire to evacuate the bowels, accompanied by acute pain, and burning heat in the region of the anus, or lower portion of the bowel, called rectum.

It is common in the last months of pregnancy, and is caused by the compression of the enlarged womb upon the rectum, or by that of an

accumulation of fæces in the lower bowels, in obstinate cases of costiveness, and also in cases of severe diarrhœa or dysentery. It is an exceedingly painful and spasmodic disorder, causing repeated strainings, which may induce premature labour, or miscarriage.

Treatment.—The chief indications of treatment in cases of pregnant women, or whenever the disease occurs to the male sex, are to relieve the spasm by a full dose of opium, morphia, &c.; to open the bowels by appropriate means, (see p. 339), to allay irritation of the rectum by opiate lavements, suppositories, or emollient and narcotic fomentations, the free use of warm baths, &c. The disorder in general yields very rapidly to the use of these remedies.

Besides the diseases of the stomach and intestinal canal already described, there may be the different forms of hernia or rupture, as enterocele, epiplocele, cystocele, &c.; and these are to be treated upon ordinary principles.

It is, however, an acknowledged obstetric axiom, and I am convinced a most correct one, that no cutting operation should be performed during pregnancy, unless the bowel is strangulated, and in danger of mortification, as such operations, in the former as well as in the latter cases, are generally fatal.

The hernial protrusions, or ruptures, should be properly supported by trusses, and bandages during pregnancy; and with the hands during labour, (see p. 301).

Ruptures often disappear after delivery, when the abdomen and womb are reduced in size. But this is not the case when the ruptures are chronic, or of long standing, or irreducible, many examples of which have fallen under my own observation.

The pressure of the enlarged womb upon the bladder may cause—

Retention of Urine.—This disease is frequent in the last months of pregnancy. It is termed dysuria, strangury, and ischuria, by some obstetric authors; but British writers do not employ these terms synonymously.

Dysuria or dysury, as the word implies, is a difficulty in passing urine; strangury, when the fluid passes drop by drop, with great straining and pain, as is often caused by the absorption of Spanish flies from a blister, or the internal use of the same remedy. The term ischuria is applied by some to the latter; ischuria renalis is applied to suppression of the secretion of urine in the kidney; and ischuria vesicalis to retention of urine in the bladder. The latter is caused in cases of pregnant women by the pressure of the enlarged womb on the neck of the bladder, or urethra. This may happen, when the womb is considerably enlarged, as in the last three months of gestation; when the organ has descended too low in the pelvis, or bones which surround it, when the organ is forced backwards causing retroversion, (see p. 294), forwards, causing anteversion, (see p. 295), or to either side, forming lateral obliquity, (see p. 296). When there is complete retention of urine from any of these causes, the fluid may accumulate in the bladder, distend and irritate the parietes or walls of that organ, or cause inflammation of its internal coat, indeed of its muscular and peritoneal, and give rise to a mucous or catarrhal, or purulent, or sanguine-purulent

discharge from that organ, which may be glary or foetid, accompanied by a frequent, or sometimes an incessant desire to pass urine, with severe pains in the bladder, urethra, ureters, kidneys, loins, groins, as well as of the inferior and superior extremities. If the urine were allowed to accumulate in the bladder, it would become decomposed and putrefied, and if absorbed into the blood, would produce a species of fever, which Baron Richerand and others have termed urinous.

In fine, if the bladder were excessively distended, it might be attacked with paralysis, or it might rupture, when the urine would be effused into the cavity of the abdomen, and this would be followed by fatal inflammation of the peritoneum or bowels.

I have attended one case in which the bladder was so distended, as to be distinctly felt, midway between the navel and the pit of the stomach. In another case, it was necessary to draw off the urine daily, for two months, yet recovery happened in both cases. Lamotte describes the case of a woman who suffered from so much pain in the abdomen, as threatened abortion.

Treatment.—The treatment must vary according to the cause of the retention of urine. When this is undue pressure of the womb during the latter months of pregnancy on the urethra, neck of the bladder, or upon the bladder itself, it will be necessary to remove such pressure, by introducing the fingers into the vagina, and by restoring the womb to its proper position by the fingers and change of posture of the woman; and the compression being removed, the urine will escape freely. When the womb is enlarged, and strongly presses the abdomen forwards, causing anteversion, this will be remedied either by placing the woman on her back, or by supporting the abdomen with a proper bandage; and should these means fail, it will be necessary to use a catheter. In describing anteversion, (see p. 295), I have advised, that in passing the catheter, as soon as its point has cleared the pubis, the handle is to be depressed; while in retroversion, inversion and prolapsus or falling down of the womb, it is to be elevated, as the bladder in all these cases is thrown backwards into the cavity of the pelvis. It is highly necessary to remember these directions, or the instrument cannot be introduced into the distended bladder, and the latter must be punctured to save the life of the patient, and of the infant in her womb. The usual position of a woman when the catheter is about to be introduced, is on her back or either side, with her lower limbs drawn up, or she may be in the sitting posture, the operator kneeling in front of her, or she may be standing and the operator before her, and in some cases, as when the bones of the pelvis are fractured, the catheter may be passed from the back of the patient.

Most obstetric authors advise that the woman should be placed on her back or side in bed, and that her person should not be exposed, unless the instrument cannot be passed, as in cases in which the orifice of the urethra is involved in inflammation of the adjacent parts, and cannot be detected by the touch alone, and only by inspection. But such cases are very rare. I entirely agree that the recumbent or lying posture and the person unexposed, is most in accordance with true feminine modesty, and that this position ought to be adopted as often

as possible; but I have known a young woman, a dispensary patient, who much preferred having the catheter passed in the erect posture, and who allowed several medical students to use the instrument in this position. I have also known a charge of attempting to induce criminal abortion made against a most respectable and experienced surgeon, on the grounds of having passed the catheter on a prostitute, in the erect position, which was encouraged by some rival surgeons, and his reply was, that he was in extensive practice, that there was less time employed in using the instrument in the erect than in the recumbent posture, and also that the operation was more readily and easily performed. There is no anatomical objection, in my opinion, to perform catheterism in the erect position in one sex more than the other, unless to prevent the exposure of the woman, but this is often inevitable, when she is in bed, while the basin placed between her limbs is being withdrawn, for the purpose of emptying it. (See *Introduction of the Catheter*, p. 43).

Mr. Ward, of Bridgewater, informed me, after the preceding remarks had been in print, that he has been in the habit of passing the catheter in the erect position for some years past, not only for the purpose of saving time, but also as less troublesome to the woman. His mode of operating is as follows:—

He has attached to the female catheter, a gum elastic bottle, in preference to a bladder, as first proposed by Professor Montgomery of Dublin, both of which contrivances were devised to prevent the exposure of the woman, and the bed from being wetted on removing the basin which contained the urine. Mr. Ward passes his right hand, which holds the catheter, to which is tied a gum elastic bottle, under the dress of the woman while in the erect or standing position. The extremity of the catheter is placed upon the middle of the first phalanx or bone of the index finger, and secured in that position by the thumb and middle finger. The point of the index finger is next applied to the meatus urinarius, or external orifice of the urethra, and the extremity of the instrument is readily passed with the thumb and middle finger into the urethra.

As soon as the gum elastic bottle is filled with urine, the catheter is withdrawn, the urine evacuated, and the instrument re-introduced, if necessary, in the manner above mentioned, and without any exposure of the woman's person. It is to be remembered that the female urethra is no more than an inch and half, while that of the male is eight or nine inches in length, so that it is much easier to pass the catheter into the former than through the latter. It is also important to state, that Mr. Liston, the justly celebrated surgeon, is in the habit of passing the male catheter with one hand, so that the instrument may be used with not only the same facility, but with greater in female cases, on account of the shortness of the urethra. It appears to me, that Mr. Ward's method of using the female catheter is an improvement on the ordinary one, of placing the woman on her back or side, and the operation is frequently performed while the female is in the erect position in most parts of Continental Europe; but only of late, and comparatively seldom, in this country. It is to be borne in mind, that male catheters

and bougies are most frequently used in the erect position, and there is no scientific objection to this posture as regards the other sex.

When the bladder becomes considerably distended, it may be attacked with paralysis, and then the frequent use of the catheter or leaving the instrument in the affected organ, so as to prevent any accumulation of urine, and to allow the sides of the organ to be in contact, to favour its regaining its muscular power.

Tonics may be administered internally, and strychnia prescribed, as in other forms of paralysis and nervous affections, and this will be found a most valuable remedy in a great majority of cases, as I can attest from an extensive dispensary and private practice. It is important to state, that during the use of this remedy, the bowels should act daily, with or without the use of aperient medicine. I have also combined strychnia with purgatives and tonics with great advantage, (see p. 339), and if given alone, it should be as follows:—

℞. Strychniæ, gr. j. conf. rosæ, 3ss; pulv. glycyrrhizæ, ʒss.

Tere intime, et divide in pilulas xij—xv, quarum capiat unam bis in die.

The dose of these pills is one twice a day, for two or three weeks, then one three times a day, and at the same interval four may be taken daily; but I have never met a patient who could take more than five daily, without suffering more or less from spasm in the muscles, or other unpleasant sensations, although M. Magendie, and Dr. Bardsley, have recorded several cases in which two grains were borne daily. It is, however, but justice to state, that the observations of both these eminent physicians were made some years since, when strychnia was first introduced, and when it was like most other extremely valuable remedies, more adulterated than it is at present.

Some European authors advise the injection of tonics into the bladder and rectum.

Retention of urine sometimes causes catarrh of the bladder accompanied by mucous or muco-purulent discharge, for which emollient anodyne vesical injections, mucilaginous drinks, warm baths and fomentations, will be useful.

When retention of urine is caused by stone in the bladder, catheterism must be employed, and in extremely severe cases, lithotripsy, lithotripsy, or lithotomy, may become necessary. When retention of urine is caused by spasm in hysterical, nervous and sensitive, or irritable subjects, recourse must be had to emollients, narcotics, antispasmodics, and the use of the catheter.

If inflammation of the bladder is threatened, bleeding, leeching, warm baths, fomentations, and the usual antiphlogistic remedies should be employed. When there is pain in voiding the urine, or complete retention of it in the bladder caused by hæmorrhoids or piles, leeches should be applied round the anus, or to the perineum, warm baths, fomentations, and narcotics, more particularly the belladonna ointment. This generally affords sudden relief in most cases.

℞. Extract. belladonnæ ʒj—ij; adipis, ʒi. Fricetur ʒj, circa anum mane nocteque.

Incontinence of Urine.—This is often a troublesome disorder in the

last three months of pregnancy, when it is caused by the pressure of the womb on the fundus of the bladder, forcing it against the symphysis pubis, and diminishing the capacity of the organ. It may also arise from irritation, inflammation, or paralysis of the bladder, and is often caused by the pressure of the womb preventing the usual dilatation of the bladder. Incontinence of urine likewise frequently occurs at the approach of parturition. It is sometimes caused by atony or want of tone in the neck of the bladder, induced by the compression of the enlarged womb.

Treatment.—When the disease arises from compression of the womb, irritation, inflammation, or paralysis of the bladder, the exciting causes must be removed, as described in the preceding article on retention of urine.

In many cases, delivery alone will effect a cure.

The last disorder of the digestive organs which deserves notice, is one of a most painful description, for which there is little sympathy, unless by those who have suffered from it, viz, toothache; and which might have been placed at the beginning of this article, were it not considered so insignificant by most persons, and were it not of only rare occurrence during pregnancy, as many women do not suffer from it at all, although most generally do at some time or other. Here I must observe that there is no disease so little understood as the different kinds of toothache, or about which there is so much quackery and ignorance displayed,—a charge that can be justly made in nine cases in ten against modern dentists. I cheerfully admit, that there are a few honourable exceptions. The general advice of most dentists is, the tooth must be extracted; and this is as wise, as if in every case of facial or other neuralgia, or tic douloureux, the affected part were required to be cut off, which few persons would consent to—a most proper and correct conclusion.

I think proper to state in this place, that toothache is a neuralgia or painful state of the nerves of one or more teeth, and is precisely a similar disorder to painful nerves in the face, scalp, indeed in every part of the body, and is best relieved by a free use of narcotics, which have a direct influence on the brain and nervous systems, when properly employed both internally and locally to the affected part, or as near it as possible. These remedies generally afford relief, and obviate the necessity of cutting off the part affected with neuralgia, and so also as regards the extraction of teeth, a mechanical proposal, which ought to be avoided unless every other remedy has failed, which is rarely the case.

But there is another serious objection to the extraction of teeth, as regards pregnant women, and it is this, that the extraction of a tooth, like every other painful surgical operation, may not only cause abortion, but even the death of the mother and her infant, a fact which every obstetric author of eminence and experience can attest. It therefore follows, that all surgical operations ought to be avoided, unless the lives of the mother and consequently of the infant in her womb are in danger of destruction; and this conclusion is an obstetric axiom.

It has been a matter of sincere gratification to me, to have been the first to recommend a most efficient and immediate remedy for the relief of most kinds of toothache, indeed of all cases in which it can be pro-

perly applied as hereafter described, namely, the application of pure nitric acid, whenever there is caries or a hole in the tooth. Some have denied the efficacy of this remedy, because they most probably used either an impure acid, or decomposed a good one, by employing a silver probe, which instantaneously changes the acid. If the acid be genuine, and applied with a glass tube, or writing pen, or with a gold probe, and every part of the caries or diseased part of the tooth be touched with the fluid, the relief in most cases will be immediate, and the necessity of the painful operation of extraction completely obviated. I shall describe the mode of application of the nitric acid more minutely when I have first pointed out the different species of toothache, which I now proceed to do; and I shall leave the scientific reader to form his own opinion as to the comparative merits of extraction and non-extraction, or partial preservation of such important organs as the teeth.

Odontalgia.—Toothache.—This is often a troublesome disease to pregnant women, may greatly derange the general health, and sometimes cause abortion. In some cases, the teeth are sound, and the disease arises from the sympathy of the uterus with the dental arches, for every part of the body is connected by nerves, and this most frequently happens to nervous and delicate women. When toothache occurs after the third month of pregnancy in full habits, it is generally caused by plethora.

The derangements of the stomach and digestive organs will often excite disorder in the gums, tongue and teeth, and are among the causes of toothache. Caries or decay is the most frequent cause of the disease. When toothache is purely nervous or spasmodic, it is not accompanied by any disease of the teeth, gums, or alveolar canals called sockets. The pain is in the dental nerve, is lancinating or piercing, is in general extremely severe, returns periodically, at certain hours of the day, and in certain states of the weather.

When the disease is caused by plethora, there will be swelling, redness, and heat in the gums.

When toothache arises from gastric derangement, there will be usual symptoms of the many forms of indigestion, as acidity, flatulency, &c.

When there is caries, the cause will be evident on inspection.

Treatment.—When the disease is spasmodic and purely nervous, it will be speedily relieved by the internal and external use of narcotics, as morphia, &c., emollient and anodyne fomentations. A full dose of morphia, or the sedative solution of opium, should be administered, and the cheeks rubbed with camphorated oil and opium.

℞. Ol. camphor, ℥iv; tinc. opii, ℥iv. Misce in usum.

When the pain returns periodically, it will generally be relieved by a combination of quinine and opium, as in ague and other periodical disorders.

℞. Quinæ disulphatis, gr. xij; acidi sulph. dil. m. xij; aquæ menth. pip., ℥vj, liq. opii, ℥ss—j. Dosis coch. amp. ter quaterve in die.

The quina may also be given in tonic and bitter infusions, in cases of delicate women.

It is important here to state, that in nervous or spasmodic toothache, the extraction of the tooth or teeth greatly increases the pain instead of relieving it—a fact well known to most persons arrived at the adult age.

When toothache arises from plethora, it is to be combated by general and local bleeding, cold lotions, purgatives, and other antiphlogistic remedies. When the disease is caused by gastric derangement, aperients, antacids, and tonics should be employed, (see p. 432).

Lastly. When the disease is caused by caries, the pain will often instantaneously cease on the application of pure nitric acid to the affected part. I have already stated, that I first proposed this remedy, (see p. 442). The best mode of applying the acid is by means of a fine glass tube or writing pen, or gold probe, and care must be taken to touch every part of the decayed spot or aperture. This can be readily done, when the teeth in the lower jaw are affected, unless when the diseased spot is on the side of the tooth which faces the next one to it.

Before applying the acid, a basin, tumbler, and some tepid water should be at hand, so that if the acid accidentally touch the gum or tongue, the patient may wash out the mouth.

The relief is often instantaneous, and if the acid is freely applied, there may be no return of the toothache for months or years. In some few cases, the acid may aggravate the pain for a few seconds, but these are exceptions, and very seldom observed.

There is much difficulty in applying the acid to caries in the teeth of the upper jaw, so as to touch the nerve, as the hole is often so small that the finest needle cannot be passed, so as to touch the nerve. In such cases the acid cannot be properly applied. To obviate this difficulty, the head should be lowered, by placing the neck on the arm of a sofa, so as to raise the upper jaw as much as possible. The acid may then be applied with a glass tube, bent at an obtuse angle, and this should be fitted with a fine piece of wire or wood, to act as a piston. A small piece of lint may be placed round the extremity, or a piece of lint placed over the teeth and gum of the lower jaw, so as to prevent the possibility of the acid touching the lower gum or the tongue. I have devised a glass tube of this kind, which I find extremely useful.

The beneficial and curative effects of pure nitric acid, in toothache arising from caries, is of great importance, not only in caries of pregnant women, but also in that of children, and of all persons, as it prevents the necessity of the painful operation of extraction, which ought to be avoided in all cases as much as possible, and especially during pregnancy, as it often causes abortion or premature labour.

The internal and external use of narcotics, as in nervous toothache, will also assist in affording relief.

There is a vast number of remedies used for the relief of toothache, and many inserted in the carious cavity, but of all these, the nitric acid is the most effectual in a vast majority of cases. I have repeatedly known it afford immediate relief, even in cases in which the cheek was swollen, and suppuration about to occur. There are cases in which a large dose of morphia, or the sedative preparation of opium, will afford relief. The late Dr. Blicke stated, at the Medical Society of London, some years ago, that he was able to cure the most desperate cases of toothache, unless the disease was connected with rheumatism, by the application of the following remedy to the decayed tooth: alum reduced

to an impalpable powder, two drachms, spirit of nitrous ether seven drachms; mix, and apply to the tooth. It is a curious coincidence that nitric acid, and nitric or nitrous ether, should have been advised by different physicians at different times.

2. *Disorders of Respiration.*—The enlargement of the womb during pregnancy prevents the free descent of the diaphragm, and consequently impedes the respiration, causing dyspnœa or shortness of breathing, cough, hæmoptysis or spitting of blood, and sometimes hæmatemesis or vomiting of blood; and should catarrh, bronchitis, pleuritis, pneumonia, or the inflammations of the different tissues which compose the heart supervene in the latter months of gestation, they will not yield to the usual measures, in consequence of the pressure of the enlarged womb upon the diaphragm, which will more or less derange the functions of respiration and circulation.

All these diseases, as well as muscular pains in the sides of the chest, termed pleurodynia, may continue and defy all remedies, until after parturition, and then they will readily disappear. These complaints are to be treated on the usual principles, and a cure may be expected in most cases, unless in phthisis, so soon as delivery has been accomplished. I have known bleeding, cupping, leeching, purging, blistering, &c., indeed all antiphlogistic means, completely fail during pregnancy, although the diseases above named may suddenly disappear, either spontaneously or by the use of medicine soon after the woman is delivered.

Inflammation of the respiratory organs will be greatly aggravated during labour, in consequence of the repeated straining and bearing down, and requires bleeding, leeching, and blistering, or otherwise the disease may prove fatal.

3. *Diseases of the Circulation.*—The pressure of the enlarged womb upon the abdominal viscera and diaphragm, will impede the circulation as well as the respiration, and greatly modify the distribution of blood to the different parts of the body. Pregnant women, who use nutriment freely, as well as fermented and spirituous liquors, and little exercise, often become plethoric from the third to the sixth month of uterine gestation, (see p. 429).

Plethora.—The symptoms are high complexion, hard, full, strong pulse, redness of the skin, congestion of the upper and lower limbs; the eyes are red and tumefied, there is confusion in the head, or headache, vertigo, noise in the ears, drowsiness, with pains in the sides, back, loins, groins, thighs, and mammæ or breasts.

Treatment.—Purgation, blood-letting, cold to the head, hot foot-baths, low diet, and abstinence from stimulating food or drink. The repetition of these remedies generally accomplishes a cure, and this will be rapid, after the woman has brought forth her infant.

Epistaxis or Bleeding from the nose may be caused by plethora, and may be arrested in most cases by applying cloths wetted with vinegar and water, or some other cold lotion across the nose, or to the forehead, plugging the nostrils, bleeding from the arm, hot mustard foot baths, and small doses of the ergota or ergot of rye, such as three grains every hour, or even every quarter of an hour, until thirty grains are administered. In most severe cases, in which remedies have failed, M.

Desormeaux advised the induction of labour, but this is scarcely ever necessary. I have known small doses of the ergot of rye, as above mentioned, and not such large ones as are given to increase labour pains, arrest profuse bleeding from the nose, when all other remedies had failed. This remedy has also arrested alveolar hæmorrhage, whether arising spontaneously, as in the cases recorded by M. Maygrier, and M. Hatin, or caused by the extraction of a tooth, a most remarkably successful case of which was treated by an old pupil of mine, Mr. Packer, surgeon at Hoxton, and myself. The bleeding from the gum was so profuse before the ergot of rye was advised by me, that it was proposed the carotid artery should be tied to preserve life.

Palpitation of the Heart.—This disorder is common to nervous excitable women who reside in crowded cities, and arises from the sympathetic reaction between the uterus and the heart. It also arises from plethora, and the obstruction given to the blood in the superior parts, caused by the pressure of the gravid womb on the large blood-vessels of the abdomen, in women of robust habit and sanguine temperament. This form of palpitation is observed in the last month of pregnancy, when the fundus of the womb presses upon the diaphragm, and impedes the respiration and circulation.

Women are more liable to it during a first pregnancy, because the womb ascends higher at the first developement than on any future one.

In some cases the palpitations are so strong as to be perceptible, there is heaving of the chest, the countenance is expressive of suffering, there is a tendency to fainting or complete syncope, lipothymia, accompanied or preceded by spasm or constriction of the pharynx, and sense of suffocation.

When the paroxysm ceases, there is much languor for some time.

Treatment.—Nervous palpitation is relieved by antispasmodics and sedatives, as morphia, opium, ether, camphor, assafoetida with tonics and bitters. When palpitation is caused by plethora or obstructed circulation, bleeding, and leeching the region of the heart will afford relief. The diet should be sparing, and moderate exercise in the open air will be beneficial. Tight lacing should be avoided. The head should be more elevated than the body during the night; the supper, if any, should be very slight, and taken two hours before bed-time, and the bowels should evacuate daily, either spontaneously or by the use of aperient medicine, (see p. 339).

Syncope—Fainting.—Nervous, delicate and excitable women, are often liable to this disorder during pregnancy, while those of good constitution are generally free from it. The disorder may be purely nervous, or caused by plethora and obstructed circulation, induced by the pressure of the enlarged womb on the abdominal blood-vessels and diaphragm, impeding respiration and circulation.

Syncope may return periodically every month, or every week, or oftener; and it may be induced by any strong mental emotion, by certain odours, by the movements of the foetus, by the sight of frightful disgusting objects, and by the heat in crowded assemblies. It must be obvious that all these causes must be avoided to accomplish a cure; and

I may here state that the violent motions of the foetus in the womb, will be completely suppressed by a free exhibition of morphia, the sedative solution of opium, or other narcotics to the mother. I have repeatedly known a full dose of some of these anodynes suppress the turbulent movements of the foetus for twenty-four hours, and excite unnecessary alarm in the parent's mind, that the infant had been poisoned, which was never the case. I must here also observe, that the movements of the foetus in utero, or before birth, may induce liver complaint, derangement of the bladder and bowels, unless restrained by the judicious use of anodynes, such as those above mentioned.

Every medical practitioner of experience knows as well as most child-bearing women, that all kinds of diet and medicine taken during pregnancy, or lactation, popularly termed suckling, will affect the foetus in the womb, as well as the infant at the breast.

Symptoms.—In syncope or fainting, there is a momentary suspension of the functions of the heart and brain, which may be either sudden or successive: the countenance becomes deadly pale, or expressive of suffering, the eyes are dull or dim, and seem covered with a kind of film, the pulse is small and irregular, the brain is seized with vertigo, or giddiness, the respiration is accelerated or difficult. There is a sense of buzzing or singing in the ears, the senses of smell, taste, and touch are greatly diminished, and temporarily abolished, the mental powers are prostrate, the body is covered with a cold perspiration, the limbs become inert, and unable to support the trunk, there may be nausea or vomiting, the respiration and pulse nearly or entirely disappear, the eyes are half closed, the muscles are relaxed and the joints flexible, the extremities or limbs have lost all power of motion, unless moved by a bystander, and no sign of life remains except respiration, and this can only be discovered by placing a looking-glass close to the mouth, which will become wetted, with the breath, as in the worst cases of hysteria and catalepsy, until life is extinct.

Syncope or fainting does not continue, in general, longer than a few seconds, although it may for several minutes. The signs of re-animation sooner or later return; the pulsations of the heart and arteries recommence, and are at first weak, frequent and irregular, the respiration is also re-established by degrees, as well as the restoration of animal heat; the countenance becomes animated, the eyes open, the hearing returns, and the patient gradually regains all his or her faculties. In many cases the sufferer on recovering experiences a feeling of charms, pleasure, and the greatest delight, and as the functions are gradually being restored, he or she feels, as if waking from a most delightful reverie or dream. Such were the sensations described to me as felt by a most intelligent friend on recovering from syncope, to which he had been reduced by blood-letting while labouring under pleurodynia, which had been mistaken for inflammation of the lungs. There may also be nausea or vomiting, on recovery from the fit. Besides the causes of syncope, already enumerated in the commencement of this article, I must include all exhilarating or depressing passions, as joy, grief, love, hatred, severe pain in any part of the body, certain sounds, poisons, or the smell of narcotics, prussic acid, or putrid miasms. Loss of blood by

venesection or hæmorrhage, great impediments to a free circulation of blood, as the pressure of the enlarged womb on the abdominal vessels and diaphragm, as already described in this and the preceding article, may cause the disorder under notice by diminishing or suspending for a time, the function of respiration and action of the heart and arteries, or the circulation of the blood. The presence of large tumours in the abdomen and tight lacing will produce the same effect.

I have given a most minute account of the nature and treatment of the different species of syncope in another work to which I must refer the reader, *The Physician's Vademecum*, 1837, 11th edition.

The phenomena of complete syncope are very similar to those of sudden death, and only differ from it by life being sooner or later restored in the majority of cases. It therefore must be manifest, that the diagnosis is most essential in actual practice, and more especially in those cases, which may become the subjects of criminal jurisprudence, or forensic investigation, as I have fully shewn in another work, already quoted—*A Manual of Medical Jurisprudence*, 2nd edition, 1836.

I shall here, therefore, only notice the leading points of the diagnosis of syncope, in a practical point of view.

Diagnosis.—Syncope cannot be confounded with the intense or profound species of hysteria and catalepsy, which may continue for several hours or days, (see p. 401,) because the absence of the pulsations of the arteries could not persist for so long a period without causing real death. Syncope seldom continues longer than three or four minutes, while hysteria may remain persistent for several hours, days, weeks, or months, when it approaches to catalepsy, (see p. 401). In most cases of hysteria, there are convulsions and foaming at the mouth, as well as many other premonitory symptoms, which are absent in syncope. The latter is likewise distinguished from real death by the states of the integuments, eyes, and countenance; and M. Maygrier contends, that the skin is more or less moist during fainting, which never occurs when death has absolutely taken place. The eyelids are closed during syncope and hysteria, and in the latter disorder are often in active motion; while the eyes in the former complaint are fixed and immovable, yet brilliant, and not glassy or so dim, or covered with mucus, which according to Winslow, and others, is the most certain sign, by which real can be distinguished from apparent death.

Syncope is seldom dangerous, but when frequent and long continued may cause abortion, or even death.

Treatment.—The chief indication of treatment is to restore the functions of life, and chiefly respiration and circulation. The patient should be placed in a free current of air on her back, on a sofa, or on the floor, her face sprinkled with cold water, her temples and forehead bathed with vinegar; some spirit introduced into the mouth; and ammonia, harts-horn, ether, or burnt feathers applied to the nostrils. The corset or stays should be unlaced, and frictions made on the chest, pit of the stomach, and face, with spirit, or some stimulating fluid, as eau-de-Cologne, &c.; and should these means fail, sinapisms, irritating clysters, electricity, galvanism, or the actual cautery must be resorted to in extreme cases.

When the woman recovers, she ought to take exercise in the open air, and keep the bowels regular; and if delicate, she should use antispasmodics, such as prescribed for hysteria; but when she is of a full habit, blood should be taken from the arm, the diet sparing, and the bowels well regulated.

Varices—Varicose or Enlarged Veins.—The veins of the lower extremities may become enlarged, greatly distended and knotty in the last months of pregnancy, when the womb is enlarged, and its weight compresses the blood-vessels which return the blood from the lower limbs to the heart. Delicate women, those who have had several children, and those who are exposed to a high temperature, are more liable to the disease than others.

The disease is slight at first, and chiefly confined to the course of the saphena vein, but it may ascend along the thigh to the labia, vagina, and neck of the womb. M. Hatin describes the case of a young woman, both of whose lower extremities from the insteps to the groins, presented numerous varices, some of which were as large as the finger; the external genital organs, the vagina and neck of the womb were similarly affected. This woman had four children, and was seven months pregnant of the fifth. I once attended a woman who suffered from the disease in the left lower extremity, and there was the greatest danger of the vein bursting about the middle of the leg, but this was prevented by the treatment about to be described.

In most cases there is enlargement and numbness of the limb, which more or less impedes standing and walking: but rupture of large varices may occur, and destroy the patient by hæmorrhage.

Treatment.—The chief indication of treatment is to remove, as much as possible, the obstruction to the return of the venous blood from the lower extremities, and this is to be accomplished by advising the woman to lie as much as she conveniently can on either side, as in this position the womb will not press upon the vessels which convey the blood from the lower limbs, and the varicose veins can disgorge themselves. When the woman is plethoric and robust, bloodletting may be used from time to time, with advantage. But many women cannot take the necessary repose in the recumbent position, and must attend to their domestic affairs. In such, indeed in all cases, a circular bandage should be applied from the toes to the hip, before the patient rises from bed, or she may wear a laced stocking. When the neck of the womb is affected with varices, and the woman is in labour, M. Gardien advises pressure to be made with the fingers upon the enlarged vessels, to prevent their rupturing, but should they burst delivery ought to be accomplished as rapidly as possible; cold astringent injections may be used, or compression made by plugging the vagina very tightly with lint, cotton, or a piece of sponge wetted and oiled before its application. Such cases are, however, of very rare occurrence.

Œdema, or Swelling of the Inferior Extremities.—Many women are affected with œdema of the lower limbs, during the last months of pregnancy, in consequence of the pressure of the enlarged womb upon the lymphatic vessels. The disease rapidly disappears after delivery, when the womb becomes reduced to its ordinary size in the unimpregnated

condition. The swelling usually commences at the instep, ascends along the leg and thigh, and sometimes extends to the parts of generation. In some cases the disease is partial, while at other times both extremities are very much swollen. The disease is atonic when it occurs in delicate subjects, or tonic in persons of full habit. When the limbs are very much swollen they impede motion; and when the swelling extends to the genital organs, it may cause so much obstruction to the descent of the infant's head during labour, as to require the forceps, as was once employed by M. Capuron. I saw a case of immense œdema in both lower extremities of a lady aged thirty years, whose husband had deserted her, and whose mind was greatly depressed. She had a strong impression that she should die undelivered, but the parturition was natural, and the swelling greatly diminished in three days after her delivery.

The disease usually commences between the seventh and eighth month of pregnancy, the swelling is at first white, indolent, and more or less circumscribed, and closely resembles anasarca or dropsy of the flesh. It is very much increased towards the evening and night, and is diminished in the morning. It sometimes becomes red and inflamed, and then requires cold lotions, the recumbent position, and purgatives. The patient should lie on either side as much as possible, so as to prevent the pressure of the enlarged womb on the lymphatics and blood-vessels. The serosity or fluid which is effused may be absorbed by rubbing the affected limb with an ointment of the iodide of potass combined with opium or morphia. A bandage may be applied round the limb, as in cases of varicose veins, described in the preceding section, and this often affords considerable relief. The bowels should act daily, either with or without the use of medicine.

There are other diseases of the extremities which I shall describe under the head of Lesions of the Organs of Locomotion or Progression, in a future article.

4. *Diseases of the Cerebro-spinal System during Pregnancy.*—There are many disorders of the brain, of the senses, and of their functions, excited during pregnancy, the chief of which are cephalalgia or headache, insomnia, agrypnia, or loss of sleep, and disorders of vision, hearing, smell, and locomotion. These complaints are caused by the sympathy which exists between the womb and the brain, indeed, which exists between all parts of the body by nervous connexion; and again by the compression of the enlarged womb upon the blood-vessels, nerves, and lymphatics in the abdomen, which impedes respiration, circulation, and causes many nervous derangements in the head, chest, abdomen, as well as in the superior and inferior extremities.

Cephalalgia—Headache.—There are two varieties of this disease, the one purely nervous and periodical, occurring to delicate, sensitive, hysterical, and hypochondriacal persons; the other to persons of sanguine temperament and full habit, and arising from determination of blood to the head, or accumulation of it in the affected part, caused by obstruction to the respiration and circulation, as so often and so necessarily mentioned in these pages.

The first species is excited by all mental emotions, the second by full diet, the abuse of spirituous fluids, and the numerous causes of apoplexy.

When the whole or the greater part of the scalp is affected the term cephalalgia is employed; when one half of the head is pained, the disease is called hemicrania; when the pain is circumscribed and may be covered with the point of the finger, it is called *clavus hystericus* (see p. 401); and when the pain is confined to the brow it is termed *orbital cephalalgia*.

Nervous headache is more frequent in the first than in the latter months of pregnancy, and generally disappears as gestation advances.

Plethoric headache is most common about the fourth month of pregnancy, and during the remainder of the term of gestation.

Persons who suffer from dyspepsia or indigestion are often liable to headache, which has been preceded, or will be accompanied by the usual symptoms of gastric derangement, or by disorder in the liver and costiveness.

Treatment.—The treatment must vary according to the nature of the disease. If the headache is caused by too much blood in the brain, bleeding, leeching, or cupping, purging, and low diet, will be necessary.

When the complaint is nervous, periodical, or spasmodic, anodyne fomentations, morphia, or the sedative solution of opium combined with quinine, as well as all the means advised for intermittent fever, will be tried with advantage, as in other periodical disorders. (See *The Physician's Vademecum*, 1837, by the author). If the disorder depend upon derangement of the stomach or liver, it will generally be removed by relieving the disease which gives rise to it. The application of common or aromatic vinegar, or of ether, to the forehead and temples, as well as smelling to these, or to ammonia, hartshorn, different snuffs, &c., often affords relief.

Insomnia—Agrypnia—Want of Sleep.—Many pregnant women suffer from want of sleep, which renders them very irritable; and delicate nervous persons are most liable to it. This disorder is a neurosis or nervous affection. If long continued it injures the general health, deranges digestion, and predisposes to hæmorrhage or flooding, as likewise to abortion and premature labour. It is best treated with mild aperients, the sedative preparations of opium or of other narcotics, and also by the use of tonics in some cases. Warm baths are often useful. Women of full habit are often relieved by blood-letting, and also by the use of purgatives. Want of sleep is only temporary, and speedily ceases by the use of the above named remedies.

Convulsions.—This disorder may occur at the commencement, middle, or towards the end of pregnancy, and is most common to nervous, delicate, and irritable women. Convulsions are caused in the beginning of pregnancy by spasm of the womb, sometimes by percussion or blows on the abdomen, by frights, bilious attack, or by great depression of mind, as experienced by persons who have been seduced and afterwards abandoned. Plethora is the most frequent cause of convulsions about and after the middle period of pregnancy; and the disorder may also be excited by the pressure made by the enlarged womb upon the pelvic and abdominal organs. It may sometimes arise from irritation in the digestive organs.

When the fits are slight and of short duration, there is little danger,

but when frequent, severe, and prolonged, abortion may occur, and even death may happen. (See p. 318).

Treatment.—Nervous convulsions are most speedily subdued by free doses of sedatives and antispasmodics, as morphia, sedative solution of opium, camphor, castor, assafoetida, &c. When there is much debility, quinine and other tonics will afford relief. If the woman is plethoric, bleeding will be required, and also anodynes and antispasmodics. Leeches, or cupping on the temples or nape of the neck, with brisk purgation, are often highly beneficial.

Lesions of the Senses—Neuroses of Vision.—Pregnant women, as well as all other persons, sometimes suffer from optical illusions, as vertigo, dazzling, diplopia or double vision, nyctalopia, dimness of sight at night, hemeralopia or day blindness, amaurosis or nervous blindness, muscæ volitantes or minute objects floating before the eye, spasm and neuralgia of the eye, hemiopia or diminished vision, the person only perceiving a part or half an object, ocular spectra, as when imaginary objects are supposed to be seen which cannot be observed by other persons, acromatopsia, when there is a difficulty in distinguishing colours, or when substances are supposed to be of different colours from their natural hue.

These nervous affections are excited during the early months of pregnancy by the sympathetic reaction between the womb and the brain; and, towards the end of gestation, by plethora, from which many women suffer. These affections are only temporary in the majority of cases, and speedily disappear after delivery, though they may recur during lactation, when too protracted.

Treatment.—When purely nervous, narcotics, antispasmodics, tonics, and all means for the improvement of the general health should be employed.

When caused by plethora, general bleeding, leeching, purgatives, low diet, are the best remedies. The reader will find a most comprehensive yet concise account of these affections, in Mr. Houston's very valuable *Manual of Diseases of the Eye*, 1840.

Neuroses of the Hearing.—The nervous affections of hearing arise from the same causes, and require the same treatment as those of vision just described. These disorders are also numerous: dysecia, or difficulty in the perception of sounds; paracusis, or a confused perception of sounds; surditas, or complete or incomplete deafness; tinnitus, or singing or tinkling in the ear; besides which the patient may hear very different sounds or noises, apparently proceeding from the brain. These nervous affections may occur in the early months of pregnancy, during which the sense of hearing may become acutely sensitive. They usually disappear by the use of narcotics, tonics, purgatives, bleeding, &c.

Neuroses of Smell.—Some women are not affected by odours during pregnancy, while others not only dislike odours which they considered agreeable and pleasant before conception. I know a lady who becomes sick at the dinner table from the odour of any animal food; while there are others who are disgusted with the smell of a rose or any other fragrant flower, and more who will respire the most offensive and infected odours.

These derangements are temporary, and seldom require any treatment. Antispasmodics, opiates, morphia, tonics, and mild aperients, generally effect a cure. I know a lady whose sense of smell becomes excessively acute during pregnancy; she has frequently perceived the smell of different flowers in a remote part of her house, and in those of her friends.

Lesions of Taste.—These have been already noticed in describing nausea and other derangements of the digestive system, (see p. 430), and are in general only temporary, and sooner or later completely cured.

Neuroses of other Parts caused by Pregnancy.—Some women complain of pains and neuralgia in different parts of the body besides those already enumerated, during the different months of pregnancy, as pains in the *mammæ or breasts, sides, loins, groins, thighs, and legs.*

The pains in the *mammæ* are sometimes so acute as to cause great suffering, of loss of sleep and appetite.

These are generally relieved by anodyne embrocations, as camphorated oil and laudanum, and also by the administration of narcotics, antispasmodics, purgatives, and in full habits, by venesection. In some very severe cases inflammation and suppuration of the breast may ensue, unless proper antiphlogistic measures be employed, (see p. 422).

Pains in the sides are often troublesome, and may be relieved by the same means as those just advised for pains in the breast, and if these fail, a belladonna, opium or hemlock plaister, may be applied over the affected part; while some recommend a mustard cataplasm, or a blister. In all cases the milder method should be fairly tried before resource is had to the more severe one, which is seldom necessary. Bleeding is often tried, in some cases with benefit, and in others without affording any relief.

Pains in the loins, groins, thighs, and legs, are sympathetic during the first months of pregnancy; but when this state is more advanced, the pains are caused by plethora and congestion of the womb and its appendages; and they are also produced, in some cases, by the compression made by the womb on the sacral, lumbar, and renal nerves, and are then often mistaken for nephritis or inflammation of the kidney, gravel, lumbago, and rheumatism. These pains are very much increased in the last months of pregnancy, when the broad and round ligaments become stretched, and the pressure of the womb is made on all adjacent organs. I fully agree with MM. Gardien, Capuron, Hatin, and others, that the difficulty in walking, and the falls to which some women are liable in the last months of pregnancy, as well as the numbness in the lower limbs, are caused by the compression of the lumbar and sacral nerves. The same cause will account for the hot, cold, burning, and other unpleasant sensations experienced in some part of the thigh, and extending to the groins, pubis, and external genitals, in some cases. The latter pains may likewise depend upon the stretching of the round ligaments according as the womb enlarges, and if it compresses the lumbar and sacral nerves which supply the anterior and interior parts of the thighs, the woman will experience pains, cramps, and unpleasant sensations when she walks, or when she makes false steps. These incon-

veniences are the most frequent at the end of pregnancy, though they may occur during the first months of gestation, and generally require no other treatment than repose, and the horizontal posture on the opposite side to the pained one, which will take off the pressure of the womb from the pelvic and femoral nerves.

Femoro-popliteal Neuralgia, or pain and cramp in the thigh, ham, and leg, arises from the same cause, the compression of the enlarged womb upon the sacral nerves, and will be also relieved by the horizontal posture, which will remove the latter. In some cases, the pains in the lower limb are caused by pressure of the infant's head on the nerves, and in such cases may continue until after delivery.

Much relief will be afforded by a belladonna plaister applied over the loins, and renewed every ten or twelve days, the painful part of the thigh being well rubbed, at the same time, with an anodyne embrocation, the bowels regulated daily, and a full dose of morphia or some other direct sedative, administered when the suffering is very severe. I have now a lady under my care, aged thirty years, the mother of eight children, and who is in the second month of pregnancy. She complains of a burning heat on the inner and superior part of the right thigh, which extends to the external and internal genitals; there is great heat in the vagina, and tenderness of the uterus on pressure; the os uteri is considerably dilated, and there is an occasional brownish discharge from the vagina, but no other symptom of abortion. There is also a very frequent necessity to evacuate the bladder and rectum, and the patient has suffered from dysentery and common cholera for some days past. She was relieved by repeated doses of the sedative solution of opium, a belladonna plaister to the loins, and an anodyne embrocation to the affected part of the inferior extremity. Such cases are of very frequent occurrence, and cause very great annoyance and much suffering.

Lesions of Locomotion—Relaxation of the joints of the Pelvis, causing inability to walk or make ordinary exertion. In some rare cases the ligaments and cartilages which unite the joints of the pelvis, (see pp. 14, 15), are sometimes relaxed during pregnancy, especially when the mother is of small stature, and the infant large. The weakness and pain in the front or back of the pelvis, or bones which surround and protect the infant before birth, is often so great as to cause difficulty, and sometimes an impossibility, of standing, walking, or making any kind of exertion.

Women of delicate constitution, lymphatic temperament, and scrofulous habit, are most predisposed to this complaint, and so also are those who are suffering from chronic disease.

The disease may continue for several months (Smellie, Baudelocque), for eight years (Denman), and for life (Desormeaux).

Treatment.—The chief indications are to improve the general health by every possible means, and to advise the patient to have absolute repose in the recumbent posture, and to firm the loosened joints by passing a long roller or bandage several times round the hip bones and pelvis, (see pp. 14, 15, 334).

Partial Paralysis of one or both inferior extremities may be caused by the pressure of the infant's head in the last month of pregnancy, or during labour, on the pelvic nerves; and the disease, like the last

described, impedes locomotion, and is, in most cases, successfully treated by ordinary remedies. It usually disappears in a few weeks, and generally within a month after parturition.

Pains in the small of the Back, or Sacro-Iliac Joints, often continue for one, two, or more weeks before or after delivery, but they are generally cured by repose in the horizontal or recumbent posture, aided by a sedative plaister, such as one of belladonna, or a strengthening one applied over the affected part.

Influence of Pregnancy on Diseases.—There is no doubt that inflammation of the brain or its membranes, of the lungs, of the bowels, &c., will be aggravated by pregnancy; but it is not correct to conclude, with Hippocrates, that all acute diseases are fatal to pregnant women. (*Aphor.* 30, sect. 5). Daily experience proves the contrary, and that such diseases may be treated with nearly the same activity as in the unimpregnated condition. It is, however, true, that the severity of acute disease, or of its treatment, may induce abortion (see pp. 306, 312); and therefore due caution must be observed.

Pregnancy aggravates diseases of the womb and its appendages, as well as of adjacent organs, in consequence of the determination of blood to those parts during its existence.

Many diseases, such as bleeding from the nose, lung, stomach, or intestines, as well as cutaneous eruptions, are cured by pregnancy; and even pulmonary consumption is arrested by this condition, although it will rapidly advance after parturition. The reason of this removal or suspension of the progress of diseases during pregnancy is, that there is a great determination of blood to the womb to effect its development, and growth of the infant; but when this ceases after delivery, the suspended diseases again increase.

Many chronic diseases of the head, chest, and abdomen, are also diminished during pregnancy. M. Nauche states, that epilepsy, mania, deafness, and hysteria, are effectually cured by uterine gestation, but there are many exceptions, for I have often known all these and other complaints return after delivery; although in general they entirely disappear.

Chronic diseases of the womb, ovaries, and pelvic organs, are aggravated by the determination of blood to these parts during pregnancy; and this has led Dr. Ashwell to propose the induction of premature labour in certain cases of ovarian disease, which rapidly enlarged during pregnancy, (see pp. 240-243, 254, 255, 261-2). The induction of premature labour in cases of ovarian disease, is, however, by no means generally adopted, for the reasons assigned in the pages to which I have just referred.

Influence of Diseases on Pregnancy.—All acute and inflammatory diseases in the head, chest, abdomen, and most other parts of the body, may retard or prevent the development of the foetus, and cause abortion or premature labour, although the pregnancy may advance to the full period, notwithstanding this numerous class of diseases, more especially if properly treated, (see pp. 306-8).

Many chronic diseases produce the same result, and yet a vast majority of pregnant women arrive at the full term of gestation, although affected

with diseases of the lung, as pulmonary catarrh, bronchitis, hæmoptysis or spitting of blood, phthisis, the different dropsies, abdominal and pelvic tumours, the numerous nervous disorders, venereal diseases: in fine, although affected with the numerous diseases of all parts of the body which have been described in this chapter, commencing at page 409, and continued to this page.

It is, however, most important, in a practical point of view, as well as in criminal proceedings, to bear in mind, that any of the moral and physical influences, or the diseases described in this chapter, may most certainly cause the death, and premature expulsion of the foetus, at any period of human uterine gestation.

Lastly, the diseases of the womb itself, or of the ovary, or of the other uterine appendages, (see pp. 41, 57, 306, 312, 369, 426, and from p. 427 to this page), may cause abortion. I have now described the most important diseases of women from puberty to old age, during the child-bed condition, in the unimpregnated state, and during pregnancy. Were I to attempt to give a history of all the disorders and diseases to which girls and women are liable, as well as the other sex, I should have included all those in *The Physician's Vademecum*, which would lead me into general medicine. I shall only observe, in conclusion, that both sexes are equally liable to disorders and diseases; and, all things duly considered, one sex as much as the other, in a state of nature. Artificial distinctions make the difference—education, habits, pursuits, but I contend, that both sexes of the human species are otherwise equal, or very nearly so, in number and mortality.

PART III.

PHYSICAL EDUCATION

AND TREATMENT OF THE

DISEASES OF INFANTS AND CHILDREN.

PHYSICAL EDUCATION

AND TREATMENT OF THE

DISEASES OF INFANTS AND CHILDREN.

IN another work I have given a most minute account of the Physical Management and Diseases of Infants from Birth to Puberty, which occupied a course of sixty lectures, each of one hour's duration, and these were published in *The London Medical and Surgical Journal*, 1833-34-35. This was the first attempt, so far as I know, to arrange methodically, a system of Infantile Hygiene and Medicine, a department of the healing art still too much neglected in all countries, as if infants were not men in miniature.

In arranging my lectures on Infantile Hygiene and Medicine, I collected a vast number of works from the time of Hippocrates to the present age, on the diseases of infants and children, but I found that not one of them embraced the whole of the subject. Some of these numerous authors described the physical education or management of infants only; while others confined themselves to infantile medicine, without any notice of hygiene. It appeared to me, however, that both ought to be included and consecutively described in one work, so as to form a complete system of Infantile Hygiene and Medicine. But to render this system perfect, it was deemed necessary by me, contrary to modern usage, to follow the examples of Hippocrates, Harris, Ballexserd, and Dewees, who commenced their respective works on Diseases of Infants with a disquisition on Marriage, the rules to be observed after conception, the influence of the mother on the fœtus in utero, the development and health of the latter, and the physical and medical management of the infant from birth to puberty. The lectures on this part of the subject were, by the desire of numerous friends, afterwards published in a separate work, entitled, *The Philosophy of Marriage in its Moral, Social, Physical, and Medical Relations*, which has since passed through different editions within a few years. I have been highly gratified to observe, that since the appearance of that production, Mr. Coombe has most ably described the influence of marriage and generation upon the offspring, in one of his invaluable works, *The Constitution of Man in Relation to External Objects*; and the subject is again fully considered by his justly celebrated brother, Dr. Coombe, in his recent treatise on *The Physiological and Moral Management of Infancy*, 1840. In this work, just published, the following subjects, among many others, are discussed: Hereditary influence—practical illustrations of parental influence—union of parents too nearly allied in blood—period of life at which the parents marry—the state of the parents at the time of conception—habitually deteriorated state of health in the parents, &c.

These and many other topics I had fully described in the work on *Marriage*, published some years before, and in which I gave a minute account of geneseology—reproduction—universal code of generation of plants and animals, in illustration of the perpetuation of the human species—ovology and embryology, or the development of the new being from the moment of conception, or animation, to the period of parturition, which will be found more fully described and illustrated by engravings, in *A Manual of Midwifery*, fourth edition, 1840, p. 116.

The arrangement I was the first to make for the foundation of a system of Infantile Hygiene and Medicine, in 1833, has been since repeatedly followed without any acknowledgment; but I must take leave to observe, that the imitations are only epitomes of the original. It was my intention to publish the lectures in a separate volume, but occupation of one kind or another, and being always busy in passing some one of my other works through the press, prevented me from doing so, but I hope ere long to accomplish my object.

The subject of marriage in all its relations being fully described, as well as the management of pregnant, parturient, and puerperal or child-bed women, the next part to be considered is infantile hygiene, or the physical and moral education of infants, which embraces the following topics, and these have been already succinctly noticed in this work, (see pp. 190-205).

Physical and moral education, or management of infants from birth until ablactation or weaning, including precepts on maternal lactation or suckling—mercenary lactation—rules for the selection of wet-nurses—artificial lactation, or dry-nursing—solid aliments of infants—the proper period for ablactation or weaning—dress—air—exercise—placing the infant on its feet—walking—sleep—repose—cots—cradles—waking—cleanliness—ablution, washing—bathing—moral management—constitution—and regulation of the nursery.

Every one of these subjects was minutely described in the Lectures published in 1833-34-35, as well as the following:—development of the nervous or cerebro-spinal system, or of the brain and spinal marrow—the intellectual functions—the senses—the moral education of man in his cradle—of the senses of vision, hearing, touch—perception, memory, imitation—importance of cheerful, kind, and intelligent nurses—physical education of infants commenced in the nursery—proper regulation of that apartment—its furniture—infants' play-things—the desire to see what they are made of, how they are made, and whether they can be put together when the parts are separated—this curiosity and love of knowledge is perfectly innocent, and should not be repressed by repression or correction. Infants are not endowed with perfect reason, and if they do wrong it is without reflection, and by the impulse of instinct; they are not responsible beings, and it is cruel to inflict corporal punishments upon them for their inevitable errors. Every feeling of humanity is roused on witnessing the barbarous brutality of some parents and teachers towards defenceless infants; and every medical practitioner shudders at the fatal results. It is now the medical opinion, that corporal chastisements may be almost entirely dispensed with; it is barbarous and cruel to scold, threaten, violently shake or strike young

infants—they should be ruled by love, affection, and kindness, and not by harshness and insensibility, and such are the proper means of correcting the errors and faults of children.

Though a great majority of parents, in all classes of society, are much too strict and severe towards their infants—indeed, there is not one perhaps in ten thousand, who knows how to treat his or her offspring properly, in all respects; there are some who indulge their children too much by gratifying their requests and importunities, and rendering them self-willed, fantastic, unreasonable, and irritable, to the great injury of their health, and to the great annoyance of every one about them. Most persons have seen “a spoiled child,” and every observant physician and medical practitioner has noticed its delicacy and debilitated constitution; although some infants of this class are robust and vigorous. It is best to steer the middle course with infants, and without severity, more especially brute force, to correct faults by moral means only; for it is rarely, if ever, necessary to use the rod. The old adage, “spare the rod and spoil the child,” is now obsolete, and very seldom right. I need not contend that it is repugnant to the feelings of every parent of cultivated mind, or humane individual, to witness, much less inflict brute force and physical violence upon helpless and innocent infancy—it is a remnant of savage, rude, and cowardly barbarity, to say the least of it. In very few instances slight corporal punishment may be required, when all moral means have failed, but this is very rarely the case. Surely, no enlightened or educated parent, teacher, or adult, could sanction, on a moment’s reflection, if he judge by his own feelings, and by common sense, a full grown person striking an infant violently on the head, the body, the limbs, or the hand; or dragging it by the hair or ear, or violently shaking it, or knocking it prostrate upon the floor; the evils of which atrocities I and most other medical practitioners have been called to remove; and the injuries have often been so great that fatal disease, the loss of a finger or fingers, or hand, and even death has been the consequence. Every humane and benevolent person will exclaim against this brutality, but medical practitioners are chiefly most unfortunately too cognizant of it, and are perfectly right in denouncing and condemning it in the strongest terms that language allows. Such cases of brutality to infants sometimes come before magistrates, but very rarely as compared to medical practitioners.

There are still many other bad and mischievous methods employed for the correction of tender infants and children—irresponsible beings. They are often awfully frightened, sometimes become fatuitous, and sometimes die, in consequence of being shut up in dark apartments, threatened with cannibals, giants, ghosts, hobgoblins, &c. Parents, nurses, and servants, are highly reprehensible for such detestable and dangerous conduct. It is not long since a child was locked up in the vaults of one of our metropolitan churches for a whole night, and when removed the following day it was an idiot. I have now a young woman, aged nineteen years, under my care, who is an idiot in consequence of having been frightened when an intelligent infant of two years old. She destroys every thing upon which she can place her hands. She is, however, much improved by the use of strychnia. How often have I

known infants and children who awoke suddenly at night, scream violently, and were extremely terrified, in consequence of having dreamed of the frightful tales told them by their mothers, nurses, or by servants. No rational person can approve of such unnatural excitement. No frightful tale should ever be told to infants or children. Another most unjustifiable act committed by parents, nurses, and all persons about children, is showing more affection and kindness to one than another. This excites jealousy, envy, and hatred, and is very prejudicial to infantile health and happiness.

When infants have sufficient reason, the best mode of education is to encourage self-love and emulation, which nature has implanted in all the human species.

They should be taught to love their parents, nurses, and each other; applauded for their good, and reproved for their bad actions; and clearly shown the impropriety of the latter. They should be informed of the difference between justice and injustice, weakness and strength, and the rights of each other. They ought to comprehend from the cradle, what is right and good, as well as justice, paternal authority, the nature of an equitable rule of conduct, their duties to all, and most particularly to their Creator.

The management or education of the intellectual faculties belongs to the domains of medicine and metaphysics. Two points on this important subject deserve attention. The first, that man is naturally averse to labour, unless its object be pleasure or desire; and the second, that it is as extremely injurious to excite the brain by premature study, as it is the muscles by premature exercise. It is indispensable to health and a good constitution, that children of a tender age should be properly managed with respect to diet, clothing, exercise in the open air, and repose; because, without due attention to these requisites, neither mind nor body will be properly developed.

A point of great importance as to infantile hygiene and infantile development, is the proper age at which children should commence their literary education, and it is one about which a vast deal has been written of late years, and which is by no means easily determined, unless considered physiologically as well as morally.

It is well known that activity of mind and body is characteristic of childhood. Nature has implanted this in the human constitution. Indeed, the young of all animals make great exertion. The movements of an infant are almost incessant, it cannot remain quiet, it is in frequent motion, which invigorates its frame by accelerating the circulation of the blood, and sending the vital fluid to every part of the body for its nutrition. It is therefore manifest, that it is contrary to nature's laws to confine an infant, under seven years of age, for two or more hours in certain postures at a school desk, thereby depriving it of that exercise which is so conducive to its development and health. Indeed, every one admits the necessity of exercise in the open air for this purpose, and that the more that is taken, when the weather permits, the better.

I entirely agree with most modern physicians, who condemn the practice of sending infants of three, four, five, six, or even seven years

of age to school, "out of harm's way," as it is termed, because the confinement is most injurious to their development and health, and, moreover, as the mental faculties are not sufficiently strong to receive literary instruction. Few children under the age of ten or twelve years learn much at school; and it is well known that there is more information obtained at the age of twelve or fourteen in one month, than during the whole of the preceding scholastic course, and, moreover, that persons at the adult age will acquire more information in one year, than during all the time they had previously spent at school.

Every well informed medical practitioner will admit, that precocious mental exertion often does irreparable injury to health, and may lay the foundation of fatal disease, and premature death. Such is usually the fate of very young infants from the third to the seventh year of age, who are prodigies in learning and acquirements. They seldom or never arrive at the adult age, and when they do, they are delicate or in bad health, and are doomed to a premature grave. It is also well known to parents and teachers, that infants under the age of seven years are generally disgusted at the sight of books, because their understanding at this early age is incapable of comprehending the rudiments of their own language. Premature study is always an irksome and hard labour to infants, and is therefore never relished. A child immured in school for several successive hours daily, and deprived of proper air and exercise, has his growth arrested, his mind enfeebled, and gains very little knowledge; but let him take as much exercise as he pleases, have proper food, and all other hygienic advantages, and then his physical power increases, his mental power develops, his health is good, and he will now learn more in a month than in all the preceding years he has been at school.

But the young mind need not be neglected in infants who are not sent to school, for a vast deal of information and knowledge may be imparted to them by the study of natural history, and by proper explanations of the nature and uses of all surrounding objects. I may here also observe, that an hour's instruction at home ought not be exceeded during the first four or six years of age, and every possible assistance should be given to the infant, and due allowance should always be made for the difference in the degree of intelligence. I need scarcely mention that some infants have no taste for learning, and will never become distinguished under the ablest masters; and in such instances, it is not only cruel, but absolutely barbarous, to inflict corporal or moral chastisement upon them. Nevertheless, it too often happens that parents insist on masters inflicting punishment; but no humane master or mistress would be guilty of such savage conduct.

It is well known that the barbarity of brutal teachers, of both sexes, has too often laid the foundation of tedious or incurable disease, and in some instances even caused premature death. Such cases are happily of very rare occurrence at present. The attention of a child of seven or nine years of age should not be fatigued by long study. It is much better at this early age to acquire one idea than twenty at a time. In proof of the correctness of this statement, which every well informed practical teacher will admit, I may mention, that the celebrated Mr.

Edgeworth taught an infant to read any word in the English and Latin languages in the space of eight hours, not successive hours, but at the rate of six or seven minutes a-day. He also taught another infant, of four years of age, to pronounce any word in the English and French languages, in the same space of time. He maintains, and I fully agree in his opinion, that more information would be communicated by this method in large schools, in one-tenth of the time required by the usual plan of teaching. I can likewise bear my testimony in favour of this conclusion.

Miss Edgeworth improved her father's system of education, and hers is one of the best ever proposed, and has done more in the correction of scholastic errors, than any other during the present century. It is, in my opinion, infinitely superior to that of Pestalozzi, which commences so soon as the infant is capable of perception, causes a premature and excessive action of the brain, intellectual faculties, and of the senses, seriously injures the nervous system, and consequently every faculty of the mind and function of the body, and is therefore most prejudicial to the proper development and health of infants. Premature and excessive mental exertion causes enervation, deranges the whole functions of the body, induces feebleness, peevishness, fretfulness, and arrests the proper development of the corporeal and mental powers. These evils are not sufficiently appreciated by teachers, who often expect impossibilities from young infants or children, inspire disgust, and too often so much fear and terror, as to injure the best constitution.

It is now a gratifying circumstance, that there is a vast improvement in the system of education since the establishment of infant schools, in which amusements of various kinds are alternated with study, every two or three hours. This plan is now very general both in public and private schools, and removes many of the serious objections to the former systems which were so injurious to infantine health, as I have already stated. Nevertheless, I do not by any means agree to the conclusion, that infants of three years of age should be sent to public schools, however well conducted, for I feel convinced that the first rudiments of learning should be taught by parents while infants are of tender years, and there are many other advantages in parental education and kindness, while the follies, vices, and bad conduct acquired in schools by imitation, are all avoided. It is urged in favour of schools, that they sharpen the wit and enlarge the mind much more than parental instruction, and this I admit to be correct to a certain extent; but it is equally true, that very young children may learn many vices from their school-fellows, unless due diligence, and proper care and discipline be enforced. This is too seldom the case in public and other endowed schools, in which it too often happens, that proper attention is not paid to the physiology or hygiene of infants, to diet, exercise, proper quantity of sleep, difference of age or vigour, due exertion, &c. &c.; while in far too many of our endowed and corporate schools, the older and stronger boys are allowed to annoy, illuse, and tyrannize over the younger ones, and in some cases to so maltreat them as to cause death. In such cases, I maintain that the masters of such schools, whether lay or clerical, who allow such conduct, and connive at it, ought to be most severely punished

by law for such gross negligence and crime, as to suffer any man's child to be maltreated or destroyed while committed to their care, and for which they are fairly, properly, and generally too amply remunerated.

Humanity also compels me to notice the baneful system of discipline too often practised in modern ladies' boarding schools, which is much more excusable after all, than that in boys' schools, for reasons which I need not particularize.

In most schools, children of all ages, from five years old, are obliged to rise at six o'clock in the morning; there is no distinction made between the young and the old, the delicate and the robust. The period of study is about an hour or two, and then there is a short morning walk. After breakfast, which is about eight or nine o'clock, the toil of the day commences, and continues until two or three in the afternoon. During this time, girls are subjected to the most unnatural and injurious discipline; they are compelled to sit as much as possible in one position; and should they, in consequence of fatigue of certain over-exerted muscles, which is inevitable, swerve from the perpendicular, they are invariably subjected to some artificial contrivances to remedy this natural consequence. Back-boards, collars, stocks, stays, and weights, are put in requisition. When the girl bends forwards, which she must inevitably do after over-straining the muscles of the back (and her mistress would do the same thing were she to sit upright for ten minutes), a back-board and weights are employed to remedy the evil. Should she lean to one side, a weight is attached to the opposite arm. When the muscles of the neck are fatigued, and the head falls forwards, a steel collar with two sharp prongs is placed on the neck and under the chin. While all this torture is being inflicted, the dancing-master beautifies the feet by placing them in stocks, or in iron shoes. Need I denounce this unnatural and injurious system? Every one endowed with common sense—every member of the medical profession, must condemn it. The result of this plan is inevitable deformity of the spine; and hence there are few girls who escape it. Boys are not subjected to this barbarous discipline; their symmetry happily claims no attention; they change their position as often as nature dictates, whenever the muscles are fatigued; they run about, when allowed to take exercise, they strengthen their constitutions and escape deformities.

But when girls are allowed to take exercise, they are marched in regular order—in rank and file; their slow gait must be according to strict rule; they walk up and down some dusty road; they march with a solemn pace, as if at a funeral; for to run or jump would be contrary to all etiquette and polite usage, and would gain for each transgressing individual, the title of romp. When these unfortunate children return to their miserable abode, they are allowed abundance of bread and treacle before dinner, on the grounds of economy; the same description of food is finally placed before all at dinner, the same meat, &c.; likes and dislikes are out of the question; no allowance is made for the difference of taste; and woe betide any unfortunate creature who murmurs discontent. After dinner there is a short walk allowed, then study, next tea, and finally bed.

The attitude of girls at study, needle-work, writing, drawing, the

piano, and harp, has a tendency to distort the spine; and make crooked and weak backs. Brothers of the female victims, who often have nearly the same constitutions, escape, for the reasons already assigned. Girls are either placed on a stool that has no back, or on a chair which has a perpendicular slender one; the first relieves the back more than the second, but both are bad, because the individual ought to be allowed to change her position whenever it is irksome.

Strong stiff stays are also injurious. Tight lacing prevents the growth of the chest, impedes the breathing and action of the heart, causes palpitation, and renders the compressed parts a load on the lower part of the spine, which bends to one side. Want of proper exercise and tight lacing are the causes of spinal curvatures in girls; and hence we can now scarcely see a young lady with a straight back. Active peasant girls, on the contrary, are models of symmetry and beauty, because they are not subjected to the causes just described. Parents are desirous that their daughters should be highly accomplished; but they seldom bear in mind, that all girls do not enjoy the same tastes, capacities, and physical strength.

I am well aware that there are many ladies' schools differently conducted; but I am perfectly certain, from my own observation, that a very large number of them is as I have described. My sole object, as a parent and physician, is to point out errors, with the anxious hope that they may be corrected in time, and the youth of the rising and future generations materially benefited by the change and improvement. I have now enumerated the principal topics in the hygiene of infants, which occupied fifteen lectures of the course I delivered on the Physical Education and Diseases of Infants and Children, quoted at the commencement of this article; and I shall next proceed to give a summary of the remaining lectures on Infantile Medicine, or the nature and treatment of the human being, from the moment of conception or animation to the period of birth, and the age of puberty. This is a most extensive subject, and occupied forty-five lectures for its due consideration, each lecture continuing an hour in delivery; the heads of which I shall now place before the reader, and comment upon the most common diseases of infants at and soon after birth, as they are liable to nearly all the diseases of adults, as regards organs, and these belong to practice of medicine, and are fully described by me in the *Physician's Vademecum*, 1837.

Infantile Medicine—Pædonosography.—Infants are liable to nearly all the diseases of adults, and the diagnosis or discrimination of infantile diseases is extremely difficult, and must be made without any aid from the patient, who may not possess reason or the power of speech, and upon whose replies little reliance can be placed. Hence the diagnosis of infantile diseases must be deduced from a careful examination of the countenance, tongue, respiration, circulation, digestion, secretions, temperature, colour of the skin, &c.

The structure and functions of the infant at birth, and modification during infancy and childhood, should be clearly understood in the study and treatment of the diseases incident to these periods of life. This inquiry would include the function of dentition, which, if natural, is

painless. The etiology or causes of diseases, or physical influences on the tender infant, should be duly appreciated, and these may be learned by considering the numerous violations of the hygienic rules, already noticed.

The mortality of infants, and of children under ten years of age, is five times greater than at any other period of life. It is one-half in some countries, two-thirds in others, and one-fourth or one-fifth in the most civilized nations.

It appears by the result of an investigation, made nearly a century ago by Dr. Coombe at the British Lying-in Hospital, and afterwards published by Dr. Underwood, in his work on the Diseases of Children, that several women who had borne three children had lost two; those who had four lost three; five, four; six, five; seven, six; eight, seven; nine, eight; eleven, eight and ten; twelve, ten and eleven; fourteen, eleven; while several of the mothers of the different numbers had lost them all.

Dr. Merriman instituted a similar inquiry at the Westminster General Dispensary, and the result was similar:—"there was scarcely an instance of any woman who had preserved all her children, if she had borne more than three."

I have verified the preceding facts at different dispensaries, during the last eighteen years. The causes of this great mortality are errors in diet, clothing, exposure to cold, &c.

The mortality of illegitimate infants, and their destruction by violence, since the introduction of the new poor law, has led, as I predicted, to an enactment this year, 1840, against the fathers of bastard children, who are now finable to the amount of 20*l.* or 30*l.* I have fully described this part of the subject in other works—the *Philosophy of Marriage* and *Prostitution in London*, &c.—to which I must refer the reader. Under this head must be considered the good or bad effects of founding hospitals and workhouses on illegitimate infants, which were closed by the present poor law. The Grey government passed a section in their poor law bill, which threw the whole weight of supporting the bastard child on the unfortunate mother, or her relatives, and left her seducer at perfect liberty to increase the number of his victims, and add to the population with impunity; but a few years clearly showed the extraordinary increase of infanticide and female suicide, and caused the nation, almost to a man, to insist upon an alteration of that infamous law, which caused such dreadful crimes.

I think it may be taken for granted, that the mortality of illegitimate infants is fully double that of legitimate; as the former have never the same degree of parental care and proper management as the latter.

Infantile mortality is also greatly influenced by the state of morals, season, climate, epidemics, and contagious disease, as small-pox; and this statement must be admitted by any rational adult. I have adduced a great mass of evidence from many countries in the lectures on Diseases of Children, already quoted, in support of this conclusion. The introduction of vaccination has caused a great increase of infantile life, and our legislature has most wisely enforced its diffusion by enactment, July, 1840.

I fully agree with Mr. Robertson of Manchester, in his valuable

work entitled—"Observations on the Mortality and Physical Education of Children," 1827—that "many hurtful prejudices are to be eradicated, especially in the domestic management of children, and the sick. There is great room for advancement in the knowledge and treatment of diseases, but particularly in the cultivation of infantile medicine. To these may be added grave defects of an economic kind, particularly in the parochial management of the poor, the administration of many of our public charities, and in the want of a general efficient system of education; what has been done in the latter respect being in a very great degree inadequate, at least in popular districts; we should hardly err in affirming, that the rate of infantile mortality will be found to be *cæteris paribus*, in the ratio of the ignorance and improvidence of the population; a consideration which gives no little weight to the defects above mentioned." The administration of medicines, as well as the use of all remedies, requires great caution in cases of infants and children, and there is much difficulty in determining the proper doses of active medicines.

The same rules, however, apply in infantile as well as general therapeutics; and these I have specified in other works—*The Universal Pharmacopœia*, 1839; *The Physician's Vademecum*, 1837; and *A Manual of Medical Jurisprudence*, 1836.

I shall here only offer a few general comments upon the use of remedies, in cases of infants and children.

It is a general rule in practice, and a wise one, that it is much safer to repeat a dose of medicine than give an over-dose; and this equally applies to external remedies.

An over-dose may do mischief which cannot be remedied, and destroy life.

It is easy to repeat the dose as often as necessary, until it produces the desired effect.

The medical practitioner should ever bear in mind the feebleness and delicacy of the infantile constitution, and be most careful to act as mildly as possible in the treatment of diseases at this period of life.

Rules for the Administration of Therapeutics in Early Life.—*Blood-letting.*—The best rule as to the use of this remedy is that laid down by Dr. M. Hall, to watch the appearance of the countenance, and if signs of collapse appear, to arrest the flow of blood. The abstraction of blood in cases of infants and children until fainting occurs, is the worst practice that can be imagined, as convulsions or death may be produced. The greatest prostration, nay, death itself, may follow the application of a few leeches. Sometimes the hæmorrhage cannot be arrested, unless by pressure or caustic. The usual means for arresting the bleeding are, the application of cold water, vinegar and water, agaric, compression, caustic, or a wire heated to redness or whiteness. Hence leeches should be applied over those parts under which bony surfaces exist, in order to admit of compression, which should be made with lint and bandages. It is to be recollected, that the loss of blood from a single leech-bite has caused the death of an infant. No discretionary power should be left to nurses. We are always to bear in mind the rapidity with which infants or delicate children sink from exhaustion, and the difficulty of

restoring them. Bleeding can only be effected in young infants by leeching; and we must carefully watch the countenance, examine the temperature of the extremities, and the state of the respiration. Some authors are of opinion that blood may be taken in the following proportions from infants and children; but I am convinced we must be guided more by the effects produced than by the quantity taken. During the first month, it is said, that an ounce may be taken; from the second to the fourth month, two ounces; from the fourth to the eighth month, from two to three ounces; from the eighth to the twelfth month, from three to four ounces; from the twelfth to the eighteenth, from four to five ounces; from the second to the third year, from eight to ten ounces; and about the sixth year, from eight to twelve ounces. The veins on the back of the hand or instep are usually opened in young children, and the limb immersed in a basin of warm water.

Cupping is rarely used in cases of infants, on account of the vascularity and sensibility of the skin. I should think it would be so painful as most probably to excite violent crying or screaming, which would tend to cause congestion of the brain or convulsions. Dr. Burne assured the Medical Society of London, in 1834, that he was in the habit of ordering it for children of all ages, with the best success. I have not tried it, for the reasons already assigned; but I have found dry cupping often highly beneficial, both in cases of infants as well as adults.

Mustard Poultices and Fomentations.—Blisters and Irritants.—It is well known that the skin of an infant is peculiarly irritable, and therefore great caution must be observed in the use of blisters, sinapisms, stimulating liniments, or the antimonial ointment, now so much employed. It often happens that inflammation, mortification, and death, are induced by blisters and external irritants. The surface of a blister should be covered with thin muslin; and it need never be applied longer than three hours; in fact, only until the skin is reddened. It is unnecessary to cause vesication. Blistering ointment is often adulterated with various acrid substances, and hence its deleterious effects on infants. I have seen a blister on the chest followed by sloughing, and an aperture form over the epigastrium, which exposed the subjacent viscera. When any of the blistering plaister remains upon the skin, it should be gently washed off with warm water. The surface of a blister should be sprinkled with powdered camphor before being applied, to prevent strangury. In cases of children or adults, an ounce of gum acacia, formerly called gum Arabic, should be dissolved in a teacupful of warm water, and mixed with barley water, or whey; or a proper quantity of carbonate of soda should be mixed with the same fluids, and then used as a common drink, to prevent strangury or most painful passage of urine, which is often caused by the absorption of blistering plaister. A mustard fomentation should not be applied longer than five or ten minutes, and a sinapism from a quarter to half an hour, in cases of children. These remedies are applied in inflammations of the brain, chest, and abdomen. They should be removed as soon as they produce pain.

I have used warm turpentine very carefully in infantile diseases, as well as those of adults; and it has also been very much eulogised by Dr. Copland, and by Dr. Little of Belfast, in diseases of the lung,

bronchitis, asthma, hooping-cough, pulmonary consumption, croup, &c. (See Treatise on Consumption, &c.). I have also found it a most effectual remedy in deep-seated inflammations in the head, chest, and abdomen.

Cathartics.—From the natural irritability of the stomach and bowels of infants and children, great care must be taken in using purgatives. Diarrhoea is much more easily excited than controlled; and if it becomes excessive, may induce great exhaustion, stupor, and hydrocephaloid affection. In such cases the powers of life must be supported with arrow root and a few drops of brandy, aromatic spirit of ammonia, beef tea, &c.

There is now a most injurious practice prevailing in the profession, that of administering repeated doses of calomel, or hydrargyrum cum creta, to infants and children. In diseases of young and old, all the disciples of the intestinal school employ mercury. Every one knows that a person under the influence of mercury is more susceptible of cold than at any other time, and hence the diseases excited by cold are more readily induced. Nevertheless, we exhibit mercury to infants, and thereby expose them to inflammations of the brain, chest, and abdomen. It is therefore evident that this practice is injurious, and that we should combine some aperient with calomel or other mercurial preparations, to prevent their specific action on the system.

It is extremely difficult to affect children with mercury. In some cases, as much as 180 grains of calomel has been given to a very young infant without the usual effect; while, in others, a few grains will cause ulceration of the gum and cheek, mortification, and even death. Every medical practitioner should be aware of this fact, which is most important in judicial inquiries; and also that no medical practitioner, however learned or experienced, can foresee or prevent such bad effects of calomel. A cautious practitioner ought, however, always to inform the parent of the possibility, but extreme improbability of such a result, so that if it really take place, there would be no necessity for a coroner's or other judicial investigation as to the cause of death; and if any such inquiry be made, the medical practitioner should be held blameless, as he undoubtedly is, in my opinion, in all such cases.

Ptyalism of infants is often followed by sloughing of the gum and cheek; and this I have known to occur after the use of mercury in hydrocephalus. Mercury is only useful when we wish to excite the liver or mesenteric glands, and even then it should be given in alterative doses, as one-sixth or one-fourth of a grain, or one grain, as we know that the best effects on the alvine secretions are caused by alterative doses of this medicine. Dr. Philip has ably proved, that the smallest doses of pil. hydrarg. produce more improvement in the alvine dejections, than the large quantities usually given. I have repeatedly observed, that a grain of calomel given every other night, or night and morning, to children, whose intestinal evacuations were depraved, produced discharges of various colours in succession. As soon as the stools are of a rhubarb colour, the mercury may be omitted. When the infant's motions are brown, the following combination will generally cause them, in a few days, to assume the proper colour. The dose must

be regulated according to the effect produced, and two alvine dejections daily, will be sufficient.

℞. Hydr. c. creta, gr. vj—viij; pulv. rhei, ʒj; pulv. aromat, ʒss; sacchari purificati, ʒss. Tere intime, et in chartulas sex vel octo divide, detur una, mane nocteque, nisi alvus nimis soluta sit.

When the infant's motions are dark, black, and offensive, the same quantity of calomel may be substituted for the hydrargyrum cum creta, or chalk with mercury, in the above prescription, with advantage. Two or three packets of either powders will be quite sufficient to effect a cure in most cases. The diet should be nutritious, as arrow-root, sago, tapioca, canna root, or tous les mois, Irish moss, and gravy mixed with any of these, or with bread crumb, or mealy mashed potato, with a small quantity of sherry, such as a teaspoonful in a wineglassful of cold or hot water; or half a wine glassful of porter, ale, or stout, and the other half water, may be given daily, to delicate infants, whose motions are either brown or black, and who are much debilitated at the same time.

Rhubarb is a favourite purgative since advised by Sydenham, and should be always combined with some aromatic. Infusion of senna, in which there should be a few grains of ginger, to prevent griping, the fluid strained, and mixed with milk and sugar, is also an excellent purgative for infants and children. Some persons substitute manna for sugar, and this is an improvement.

Medicines of all kinds should be made as agreeable as possible for children, who, in general, have a great aversion to them, and whose lives are often destroyed for the want of them.

It is always best to coax or persuade children to take medicine, but if these means fail, and a dangerous or fatal disease exists, compulsion becomes necessary; and this may be carried into effect by closing the nostrils, holding the hands, inclining the body horizontally, when any medicine introduced into the mouth must be swallowed.

It cannot be supposed, on reflection, that either parents or physicians act cruelly in having recourse to this proceeding, however disagreeable to their own feelings, when no other means can preserve an infant's life.

The temper of children becomes irritable and peevish during many diseases; they refuse to remain in bed, or to be kept sufficiently warm in the arms of the mother or nurse, especially in cold weather; and the result generally is, some disease of the respiratory organs, which will more or less impede the respiration, and very much aggravate any other acute or chronic malady under which the infant may be labouring. Such exposure to cold must be avoided as much as possible.

Lastly, all strong drastic purgatives, such as jalap, aloes, scammony, gamboge, or elaterium, should never be given to children until milder cathartics have failed, or unless dropsy or some other disease threatens to destroy life. It often happens that infants under four years of age and upwards, are suddenly seized with the different dropsies, or some particular species, as anarsarca, which swells the external surface of the body to a great degree, rendering the respiration laborious, causing determination of blood to the head or lung, which may produce fatal congestion or inflammation in either of these parts. Ordinary remedies

usually fail in such cases, and then we may employ elaterium, contrary to what is advised in most of the works on materia medica, with perfect safety and success. An infant of four years old was supposed to be dying of anasarca, or general dropsy of the external surface, combined with ascites, or dropsy of the abdomen. It had two grains of extract of elaterium in divided doses, in six hours. This caused twenty copious watery evacuations from the bowels, and completely cured both the general and local dropsy. In an extreme case of this kind, in which death seemed to approach, such doses, guided, of course, by the effects produced, were justifiable; but I generally find that one-sixteenth, one-twelfth, one-tenth, or one-eighth of a grain, administered every three or four hours, according to the urgency of symptoms, and effects produced, quite sufficient, although in some children under the age of seven years, it may produce no action on the bowels. During the present year, a child, aged seven years, affected with anasarca and ascites, was under my care at the Metropolitan Free Hospital. Ordinary remedies had failed. I commenced with one-sixteenth of a grain of elaterium, morning and evening. This produced no effect, and the dose was gradually increased to one-eighth of a grain twice a-day. Four doses produced no effect. I remarked to several students, in the presence of the father, how singular this was, considering the great power of the medicine. Here I must mention, that the boy very strongly resembled his mother in countenance, hair, colour of the eyes, &c. The father took one of his pills, which purged him ten times, and so severely, that he declared on no account would he take another. The dose was gradually increased for the child until it acted on the bowels freely, and a cure was effected.

I have found the following formula best calculated for children from four to seven years of age, in most cases:—

℞. Extract. elaterii, gr. j; pulv. opii, gr. ss; hydrarg. submur., gr. xij—xv; pulv. cinnam. c., ʒj; sacchari purificati, ʒss.

Tere intimè, et dein divide in chartulas xvj—xij—x—viij, quarum capiat unam mane vespereque.

The following formula may also be employed, most carefully observing the effects.

℞. Etaterinæ, gr. j; alcoholis, ʒj; acidi sulph., m. iv; liq. opii. m. vj.

Dosis m. v—x. ex aquâ cinnamomi, bis vel ter in die.

The dose for adults is from m. xx—xl. in cinnamon water, which may be sweetened, as in the cases of infants.

Calomel should not be given as a purgative; magnesia, rhubarb, senna, compound powder of jalap, or castor oil, is preferable.

Emetics are to be used with caution, from the gastro-intestinal irritation usually present, and the antimonial medicines may do much mischief.

When the appetite is variable or defective, or when there is occasional vomiting or purging, or the infant picking its nose or lips, or suffering from irritation about the anus or genitals, indicated by the frequent application of the hand, and the alvine motions being of a green, brown, or black colour, or curdy or offensive, there is more or less gastro-intes-

tinal irritation present, technically called remittent fever, and popularly termed fever from teething or worms; and in such cases emetics of any kind, are contra-indicated, or dangerous and improper. Softening of the coats of the stomach and death may rapidly ensue after the use of emetics of any description.

The active ingredient in the antimonial wine is tartarized antimony, popularly called tartar emetic, a quarter of a grain of which has destroyed an infant.

I have been credibly informed, that an illiterate druggist in the eastern portion of this metropolis exhibits, almost daily, to children what he terms his favourite fever-powder, which consists of five or more grains of tartarized antimony; he never weighs, but guesses the quantity; and there is scarcely a single infant, who swallows this poisonous dose, that is not destroyed.

Narcotics—Opiates.—The preparations of opium and other narcotics should be used with the greatest caution in cases of infants and children. I have known one drop of the liq. opii sedativ., narcotise an infant. Mothers and nurses should be informed of the dangerous properties of all “soothing syrups” and cordials, such as Dalby’s Carminative, the Vegetable Soothing Syrup for Cutting the Teeth, Godfrey’s Cordial, diacodium, syrup of poppies, syrup of violets, &c. These medicines should never be administered, except by medical practitioners, unless they cannot be had; and if proper attention is paid to diet, &c., they will be rarely necessary. There is scarcely a day in which I do not point out to my pupils, infants labouring under the influence of narcotics; and experience enables me to aver, that thousands of them in this metropolis are destroyed annually by the improper use of these medicines. In cases, in which an infant is constantly narcotised, it cannot take food, absorption goes on, emaciation and death soon follow. During the first six months, one or two drops of laudanum, or half a drachm of genuine syrup of poppies, not the nostrum sold by chemists and druggists to the poor and to ordinary applicants, is the largest dose that can be given to infants.

The late celebrated Dr. Clarke, brother to Sir Charles M. Clarke, states in his valuable *Commentaries on Diseases of Children*, that “half a drachm of genuine syrup of white poppies,” not the deleterious nostrum of the shops, “and in some instances a few drops of Dalby’s Carminative, have proved fatal, in the course of a very few hours, to young infants.”

Harris, an English and able author on diseases of infants, had attested this fact two centuries before Dr. Clarke. He quaintly observed, narcotics, or soothing syrups, swelled the number of the dead, and rid those who had the care of infants of further trouble.

The celebrated Hoffman stated, that he had repeatedly seen infants labouring under convulsions and epilepsy, from the use, or rather the abuse of diacodium, syrup of poppies, and other narcotics.

I have frequently been called to infants, under the age of twelve months, who had been stupefied by some soothing syrup, exhibited by parents or nurses, for six, twelve, and even more hours; and yet by proper treatment a cure was accomplished. I saw a delicate female

infant, aged eight months, a short time since, with Mr. Bailey, of Broad-street, Bloomsbury, to whom a good sized teaspoonful of Battley's solution of opium had been exhibited by mistake, at eleven o'clock the preceding night. The mistake was not discovered until ten o'clock the next morning, when I was called to the infant. I found it motionless, the lips constantly quivering, as also the eyelids, which were closed; the fingers were straight, and the respiration scarcely perceptible. Before my arrival, the infant had had six grains of the sulphate of zinc, in two doses, but no vomiting was produced. It was fully under the influence of the opium, and was narcotised.

The *treatment* consisted in the exhibition of sherry, aromatic spirit of ammonia, in small and repeated doses, at the interval of a few minutes, and rubbing the face, chest, and extremities with ammoniated oil. The face was also sprinkled with cold water; and the infant had likewise tepid baths. This treatment was pursued for four hours, the infant being turned from side to side every ten minutes, and loudly spoken to; and at the end of that time it began to recover, when mucilaginous fluids were freely administered, with a view of preventing the stimulant effects of the sulphate of zinc. At seven o'clock in the evening the infant was nearly well; and next morning it was quite recovered. I give the particulars of this case, as they show two valuable facts; the possibility of a very young infant recovering from such a large dose of the sedative solution of opium, which is very important, not only in a practical point of view, but also in giving evidence in magisterial or other judicial inquiries.

In further elucidation of this subject, I must state that a few days prior to the occurrence of the above case, I was summoned to see another infant, aged six months, who was teething, and suffering from diarrhœa. This infant had taken six drops of the sedative solution of opium, in two doses. It became drowsy at eleven o'clock at night, and remained under the influence of the opium until nine o'clock next morning, when it began to recover; and it is to be recollected that there were only two months difference in the ages of both infants; that one took ten times the quantity of opium more than the other; that both were narcotised or rendered insensible for several hours, and that both finally recovered.

It is as yet, I believe, impossible to determine positively either in cases of infants, to the seventh year of age when childhood commences, or from this period to puberty, or adolescence, or even during adult age or senescence, what is the minimum dose of any of the preparations of opium or other narcotics, in any given case, capable of causing complete insensibility, coma, or narcotism, and for what period of time; and this should ever be borne in mind in giving evidence on such questions in any court of justice whatever.

I might introduce many cases of criminal proceedings, in which it behoves the medical witness to be aware of the fact just stated, and on the grounds of humanity, and for the advance of medical knowledge, I must be pardoned for mentioning two striking examples.

In one case that occurred at the Somersetshire Assizes, which was held 8th August 1840, and at which I happened to have been present, having been specially brought down from London, in a case of a

most foul and atrocious conspiracy, in which a most respectable and well-educated surgeon was charged with attempting to procure abortion, by medicines, the use of different instruments at different times, and also manual operations, of which he was most honourably acquitted. An unfortunate and most distressed shoemaker, named Garrett, who with his wife and infant children were in a state of starvation, was charged when in a state of frenzy, with having exhibited to two of his children some laudanum, and swallowed a portion himself, which did not prove fatal to him, though it did to one of his infants. The counsel for the prisoner most rigidly examined the surgeon who was called in, as to the exact quantity of laudanum which would poison an infant of the constitution of the deceased, and whether his treatment did not really cause death. The prisoner was found guilty, and ordered to be executed; but it is to be hoped, and is sanguinely expected, that the wonted clemency of disposition of our most gracious and truly benevolent Sovereign, will as usual be manifested in this very unfortunate culprit's case, by acts of mercy and lenity. It was clear that he had been driven to madness, on witnessing his children and his wife in a state of actual starvation, himself being in utter despair, for he swallowed what he considered a fatal dose of poison, but which was extracted by prompt medical aid. Since the above was written, his life has been spared.

In a criminal trial for rape, the woman alleged that she had taken some wine and water which her paramour had ordered, and that he had met the waiter outside the room before he entered with the beverage. It tasted strangely, and her friend took none of it. In a few hours afterwards she became insensible, and remained so for several hours, and on recovering her senses, she found the prisoner in bed with her, and he proposed to repeat the offence which he had already perpetrated.

Several eminent physicians in the United Kingdom disbelieved that any narcotic had been administered, which led to a commutation of the sentence. It was, however, afterwards proved that a narcotic had been given, for the servant at the hotel who procured it, had absconded until the trial was over. I alone held that a narcotic was given.

It appears to me, that the peculiarity of constitution is so diversified, as to be very differently affected by narcotics, and that a medical practitioner should be extremely cautious in giving evidence upon the subject.

Ovrosology, Diseases of the Ovum. Embryonology, Diseases of the Embryo. Cyamanosology, Diseases of the Fœtus. Pædonosology—Pædonosography, Diseases of Infants.

The term ovum, ovulum, ovule, is applied to the human germ before its arrival in the uterus, from the instant of conception for a few days afterwards, for at first it is in one of the ovaries, and the account of its development is technically designated ovology, or ovophysiology; while the morbid states of the ovum are comprised in ovopathology, or an account of its diseases in the first days of its existence. It is still a disputed point, as to the exact period at which the ovum or new being descends from the ovary into the uterine tube and uterus, some physiologists maintaining that this occurs on the fourth, fifth, sixth, or

seventh day, (see p. 118), so that the exact time is not as yet determined.

The term embryo is applied to the new human being during the first three months of pregnancy, when its different parts become distinct from each other; and the history of its healthful development is called embryology, while that of its morbid states is designated embryopathology or embryonosology, embryonosography. From the end of the third to that of the ninth month, the new being is called foetus, and in Greek γονη or γονος, so that the history of its functions at this period may be termed gonophysiology, and its diseases, gonopathology or gononosology.

Aristotle employed the word *κνημα* for the foetus, so that according to the moderns, it would be correct to use the terms cyamaphysiology, cyamapathology, cyamanosology and cymanosography. Some ancient authors used the word *παις*, *παιδανος* for infant, and also during childhood, so that the terms pædophysiology, pædopathology, pædonosology, and pædonosography are perfectly correct, in my opinion, as comparing the physiology, pathology of the infant at birth and during childhood, as well as the latter period, including the account of the treatment of its diseases. Such, I conceive, to be the proper heads of infantile medicine.

I first proposed all the preceding and many other terms, from 1828 to the present time, 1840, and they are now very generally adopted in most civilized countries.

According to this arrangement, the diseases of the foetus in the womb, which include those of every part of the body, for every part may be malformed or in a morbid state, first demand attention, and next, those which are induced by parturition, then those which occur soon after birth, and lastly, the common complaints of infancy and childhood.

Ovonosology,—*Embryonosology*,—*Cyamanosology*.—Every part of the ovum, embryo, and foetus, and of the parts connected with them in the womb, may be malformed by excess, diminution, or displacement of the organs.

Physiologists now universally maintain that the moral and physical states of parents are transmitted to their offspring at the moment of conception, and that these states, as well as external influences and diseases, affect, in some degree, the development and health of the new being during its intra-uterine existence.

As a general physiological axiom, it is also concluded, that any cause injurious to the health of a pregnant woman, is indirectly prejudicial to the foetus in utero.

The placenta, navel cord, membranes and fluid, which surround the embryo, are liable to numerous diseases, many of which are injurious to, or destructive of, the development and life of the new being. I have elsewhere given a most minute account of these under the present head, in the lectures on the Physical Education and Treatment of the Diseases of Infants, &c. London Med. and Surg. Jour. 1833-34, Lectures xxi. xxii pp. 138. 165. There is also a good history of intra-uterine diseases, by M. V. Andry, in his elaborate Memoir on the Diseases of the Foetus and its Appendages. *Mémoire sur les Maladies du Fœtus et de les Annexes*, par M. V. Andry, D.M.P., Journ. des Progres de Sciences et Institutions Med. 1830, T. 1.

Infantine diseases cannot be detected or prevented during the existence of the fœtus in the womb; are the most frequent causes of abortion, and are observed on examination of the ovum and its appendages, when prematurely expelled from the uterus.

Congenital alterations of organs are: 1. *Vices of Conformation*, and 2. *Alterations in Structure*. Vices of conformation are—1, those which result from an arrest of development, as when an organ only presents the rudiments of its primitive form; 2, those which arise from hyperthrophy, or excessive growth of the part; and 3, those of simple deformity in size, or in the continuity of the different parts of the body.

Morbid alterations of structure or tissue, result from changes in the colour or texture of the part, without its general form being altered in appearance. Vices of conformation which the infant may present at birth, are termed monstrosities, and those are classed as follows:

Monstrosities which arise from Excess of Development.—Infants may be born with supernumerary fingers and toes, with an increase of the vertebræ, ribs and muscles; with a double tongue, œsophagus and duodenum; others have a fusion of the sexual organs, some have a second penis, a second clitoris, four seminal vesicles, three, four, or five mam-mæ, two hearts (Winslow), a second aorta, two or three feet attached to one leg; while more have the intestinal canal divided into two junctions, terminating in a distinct anus; and lastly, the urinary organs may be double.

Twins that are united or confounded may be designated by the term *synadelphina*, and ought to be distinguished into three genera. *Omeadelphina*, composed of parts of two individuals quite similar; *heteradelphina* (Geoffroy St. Hilaire) formed by two dissimilar individuals; and *enadelphina*, when an infant is inclosed within another.

Omeadelphina.—We may establish an infinite number and variety of this genus, if we include all the points of union, and all the degrees of fusion, so that we should distinguish the syncipital, frontal, facial, sternal, ventral, pubial, occipital, dorsal, sacral, temporal, tempero-facial, pleuro-pleural, pleuro-coxal, and coxal. In other words, infants may be united together by the back of the head, by the forehead, face, breast, abdomen, &c.; in fact at almost every part of the external surface of the body. In this class, infants may be united laterally, so that the two heads may be united (tetraopsy), partially confounded (triopsy), reduced to the size of one (diopsy), still more atrophied or reduced (monopsy), the pelvis and extremities which it supports, not less varied in complete duplicity (tetramere), or incomplete (trimere), to the reduction of the simple state (dimere). It has been almost always remarked, that the infants are united by similar surfaces; and that if certain parts appear to have left their connexions in one individual, it is but to take, as if by preference, analogous connexions with another individual, (Geoffroy). So it is that in the pubia omeadelphia (chiadelphia, Dubrueil), the right side of the pubis unites with the left of the brother, and reciprocally (Palfyn, Dubrueil); whilst in sternal omeadelphia, the left side of one fœtus and the right of the other are opposed, and are united by one sternum or breast-bone, common to both individuals. In such cases the united infants have the heart, vessels, and

different organs in common; which proves that this species of monstrosity is referable to embryonary life, or that state when the organs are first developed and not perfect; then the superficial parts, placed in contact, do not develope; but the internal parts organize simultaneously and conjointly.

Omeadelpia seldom live, though there are exceptions. Buffon and Adelon record examples of two infants united together; and there were the Hungarian sisters, named Judith and Helen, who survived to the adult age; the Siamese twins, who were males, and the children Ritta-Christina, exhibited in 1829 in Paris, who were females. I may here observe, that in such cases it would be impracticable to attempt any operation for separating such individuals. An operation might be justifiable if they were united by the skin only; but this is scarcely ever the case.

When the Siamese twins were in London, I examined the band of union between them with great care; and on touching a certain part of it, both felt the pressure instantaneously and simultaneously. It was the universal opinion of the ablest surgeons in this metropolis, and in all parts of the world in which the youths were exhibited, that an operation for separating them would prove fatal to the lives of both. I published an account of them in the London Medical and Surgical Journal, which included the histories of a few similar monstrosities, and may now be quoted, as it abounds with many curious facts.

The earliest account of the Siamese twins is that of Dr. I. C. Warren, of Boston, and was published in Professor Silliman's Journal of October, 1829. It appears that they were received from their mother by Captain Coffin and Mr. Hunter, in a village of Siam, where the last-mentioned gentleman saw them fishing on the banks of the river. Their father had been dead for some time, since which they lived with their mother in a state of poverty. They were confined within certain limits, by order of the Siamese government, and supported themselves principally by fishing. Their exhibition to the world was suggested to the mother as a means of bettering their condition; to which proposition she acceded for a liberal compensation, and the promised return of her sons at a specified time. She accompanied them to the ship, and, as it was not about to sail for some time, she was invited to remain on board; but she declined, observing that she might as well part with them then as in a few days. They were first exhibited at Boston, and subsequently at New York.

From personal examination, I gave the following particulars of the Siamese youths, which differ in some respects from the descriptions of them by the French and American physicians.

They arrived in London on the 21st of November 1829, and were exhibited at the Egyptian Hall, Piccadilly, on the 26th, when many of the most eminent physicians and surgeons, as well as literary and scientific characters examined them, and signed a certificate that there was no deception practised as to their deformity. It was also stated that they were eighteen years of age, in good health, and evincing much physical power. Thus far the statement extended. On inquiry I then ascertained the following facts:—They were aged eighteen years and eight

months, and had always enjoyed good health. They were far under the size of persons of the same age in this country, and did not appear more than fifteen years old. They were extremely lively and active, mild, and good-tempered, and presented nothing repulsive in appearance. The one on the right side was larger and stronger than the other, and was named Chang; the other was called Eng, but when spoken to by their superintendent, were addressed Chang-Eng. They seemed extremely affectionate to that gentleman. They were very intelligent, and had learned several words of our language, and were exceedingly grateful for any slight marks of kindness shewn them. They amused themselves at draughts, shuttle-cock, and similar amusements. They were very affectionate to each other, and were much attached to their attendants and acquaintances. There was a strong resemblance between them, though their features differed considerably. They were perfectly well formed, except being united. Their appetite was nearly similar; and the alvine and urinary evacuations were expelled at the same time; though about the 4th ult. one was constipated for three days, while the other had a motion daily. I have observed them spit at the same time and use their pocket handkerchiefs simultaneously, perhaps this may depend upon the force of habit. They slept at the same time, and one had never been observed awake while the other was sleeping. The attendant informed me of the following curious fact:—He slightly touched the shoulder of one of them when asleep, and the other awoke and asked him what he was about; and the one touched awoke nearly as soon as his brother. When awake, touching one does not affect the other. They had always enjoyed good health, according to the mother's account, and had the small-pox together when eight years old. During the voyage to this country, one had the tooth-ache for three days, and was deprived of sleep; the other had no sleep, but experienced no pain, and stated what a hard matter it was, that one man should be deprived of rest on account of another. They have never been heard in conversation with each other, though closely watched for several hours when sitting alone.

The band of union, which is from one chest to the other, appears to be cartilaginous superiorly; it is hard and insensible, except in the middle, and if touched in this part, or within an inch of it, both feel immediately; if pressed on nearer to either, then only one is affected. In the centre of this link inferiorly, is the umbilicus, so that both must have been supplied with blood from the parent through the same medium. The sexual organs in both are well developed; and here we cannot but observe the wisdom of nature, however great her aberration in this union, in establishing but one sex in this phenomenon. Such was likewise the case in the instance of the Hungarian sisters, hereafter described; and again we observe but one sex in the case of Ritta-Christina, now in Paris, and also in the numerous examples quoted by Haller.

In walking and taking exercise their motions are simultaneous and free—a hand of each is either around the neck or waist of the other; in examining different objects, one brings both hands in front, and then the other very rapidly afterwards. Their intellectual powers are different:

the right one, Chang, is more intelligent and lively than Eng; the former is more irritable—the latter milder in temper. The circulation is synchronous, pulse 74, and the respiration of the same regularity in both. The perceptions are more acute in one than the other. The intestines seem to protrude into the band of union on coughing. Upon the whole, this monstrosity is totally different from any hitherto recorded, both in the intellectual and physical qualities of the individuals; they seem to enjoy the same moral and physical relations. Many anatomical, physiological, pathological, and therapeutical considerations are involved in the structure of these youths, which afford ample grounds for hypothesis and theory. If they have but one mind, where is it situated? If two, are their consentaneous volitions merely to be ascribed to the force of habit? Would the remedies applied to one affect the other, or the disease or death of one affect the other? What is the structure of the band of union? Is the point of sensation in this band, which, when touched, mutually affects both, dependent on nervous union? Would an operation for separating them be practicable? Are they capable of performing the functions of reproduction? Could they marry? Is one accountable for the acts of the other? If one murdered a man, could he suffer death without endangering or destroying the life of the other? Chang was irritable, Eng mild; suppose the former killed a man, and the latter endeavoured to prevent him, would it be just or safe to execute the former, and most probably destroy the latter? If one contracted a debt, and was sentenced to imprisonment, would it be right to incarcerate the other? In fine, the phenomena presented by these youths surpass the conclusions of physiologists, judges, lawyers, and legislators. These and numerous other inquiries might be made, on which I have not now time to enter. The phenomena are the most extraordinary on record, and are well worthy of the attention of all ranks of scientific individuals.

Chang and Eng have settled down for life on a fine farm on Trapp Hill, a post town in Wilkes County. They write us they are delighted with their farming operations, and they are as happy as lords.—*Boston Transcript*, Aug. 1840.—*Public Press*, Sep. 1840.

Another case, very similar to that of the Siamese youths, was exhibited in London, in 1723. Two females of the adult age were united together, but their mental and physical functions were perfectly different; they were born at Szony, in Hungary, in 1701, and were exhibited in many parts of Europe. They were united at the back below the loins, and had their bodies and faces placed half sideways towards each other; they had one anus and one vulva. The viscera were double, except that the vaginæ and recta united; there were two bladders and urethræ opening separately; the sacra were blended into one, and they had but one os coccyx; the two aortæ united before the origin of the iliacs, and the inferior cavæ were joined at the same part. They were not equally strong or well-made; and the most powerful, for they had two wills, dragged the other after her wherever she wished to go. At six years old one had paralysis of the left side, and was ever after weaker than the other. There was a difference in their functions, in health and disease; they also had different temperaments. Neither alvine nor urinary

evacuations took place in both at the same time; the menstrual function appeared at different times, one having been indisposed a week or more before the other; sometimes one, sometimes the other, would be most disordered at this period. When one was asleep the other was awake; one had a desire for food when the other had not. They laboured under the small-pox and measles at the same time, but other diseases separately. They were called Judith and Helen. Judith was convulsed when Helen was well; one had catarrh and colic, while the other was healthy. Their intellectual powers were different; they were brisk, merry, and well bred; could read, write, and sing prettily; could speak several languages, Hungarian, French, and English. They died (according to the account of the *Phil. Trans.*, vol. i.) together; but this was not the fact, for M. Moreau de Lasarthe informs us, in his work *Sur les Monstruosities*, "that one had been feeble from birth, and died after a very protracted illness, during all which period the other was healthy; and at the moment the former expired, the latter was engaged in conversation, and manifested no symptoms of suffering: about four minutes after the death of her sister, her eyes rolled, she seemed for an instant to be convulsed, and immediately expired"—showing, notwithstanding the independence of each as to mental power, that both were nevertheless involved in one common condition of mortality. They were buried in the Ursuline Convent at Presburgh. This case is recorded by Haller, *De Monstris Op. Minora*, vol. iii., lib. 1, c. 28; similar cases, lib. 1, c. 26; also by C. Drieschii, *Hist. Magnæ Legationis Cæsaræ*, &c. p. 441.

A case somewhat similar is recorded by Buchanan, in his *History of Scotland*; the subject of it, a male, was born in the reign of James IV., was twenty-eight years old, and one of the bodies expired some days before the other. Some of the French periodicals fell into a mistake, when they referred the history of this monster to the reign of James III. The case is published in one of their own journals, (*Journ. des Savans*, 1684, p. 346). This double man was united at the umbilicus or navel, but single below that part.

The king ordered him to be brought up with great care. He made a rapid progress in music. The two heads learned many languages, they discoursed together, and the superior halves sometimes struck each other, though in general they lived in concord. If the inferior part of the bodies was pinched, the two resented it at the same time. But if one was irritated superiorly, he only experienced the effects. One died several days before the other. (*Rerum Scoticarum Historia*, vol. lxiii. auct. G. Buchanan).

Zacchias describes a similar case of an individual, aged twenty-eight years, who had another hanging from the chest. The first was baptized Lazarus Colloredo, the second John Baptista. The latter was nourished by the food taken by the former. He was so weak that respiration was scarcely perceptible; he seldom opened his eyes, and hence the narrator, who was physician to his holiness, doubted much that he had a rational soul, and was equally dubious whether baptism should have been applied. The case is related in his immortal work, *Quæstio. Medico-legales*, lib. vii., tit. 1, quæst. ii. Ambrose Paré describes a similar case; the individuals were aged forty, (lib. xxiii. c. 3). A boy,

aged six years, is described, who had the lower extremities of a brother suspended from the navel; he felt what was done to the brother, yet he could not move its limbs, which were cold. (Phil. Trans. vol. lxxix).

Cases similar to Ritta-Christina are recorded (Haller, Op. Cit. lib. i. c. 21—28). A case exactly similar is described in the *Journal des Savans*, 1684, p. 27; the lower part of the body was male; there was no rectum; and death took place on the seventh day. Haller also details a case nearly similar. Two well-formed female infants were united at the chest and epigastrium; the labour was difficult, they were born dead. The funis umbilicalis contained four arteries and but one vein; the abdomen was single above and double below the navel; there was one liver, with two gall bladders, one large heart, with all the vessels double. (Op. Cit. c. 29). He relates many cases of monstrosity in the human and inferior classes of animals, (c. 30—32). An infant with a double head was described by Sir Everard Home, which lived two years. (Phil. Trans. vol. lxxx). The skulls are in the Hunterian Museum at the Royal College of Surgeons, London. An example of an ox with a double head, and a cow with two heads and necks, that attained the full size, is described in the same work, vol. xlix. In the *Mem. de l'Acad. des Sciences*, 1733, p. 366, Winslow relates a case of an Italian who had two heads; the second was connected to the chest below the third rib. Whatever touched the additional head was felt.

Case of United Twins.—A case of twins, united together like the Siamese youths, is related in the *Asiatic Journal*, No. I., New Series. “The children were females, and born at a village in Coimbatore, in the month of October, 1804. At the period of examination, October, 1807, they were, of course, three years old. One of them was thirty-four inches high, the other a quarter of an inch shorter. The heads of both were rather long, and the sides of each head much compressed; the features of each strongly resembled the other. The bodies were joined from the lower part of the breast-bone to the navel, which was common to both. They were thus face to face, and could sleep in no other position. In walking, they moved sideways, and sometimes circularly. They generally slept at the same time, but not always; and one would cry whilst the other did not. If the body of one was pinched, the other did not appear to feel; but if the connecting part was pinched, both were sensible of pain. Medicine administered to one affected both. The evacuations of each were regular, but at different periods. Both were healthy children, and not otherwise deformed. One was loquacious; the other talked very little; the liveliest was rather stouter than the other. Both had the small-pox at the same time, and favourably. In moving or looking different ways, or rather in directions contrary to their natural position, they crossed their hands and arms. They could walk up stairs, and were active in playing with other children.

“The mother of these girls was a woman of the weaver caste; she did not, according to the statement of the father, who attended her, suffer particularly in bringing them into the world. The same woman subsequently was delivered of separate twins, which were living at the time when this examination took place.”—*American Journal of Medical Science*.

For further exemplification of the various forms of monsters, I refer the reader to Haller's work already quoted, to Soemmering's *Abbildung, und Besekreibung einger Missgeburten*, &c. folio, Mentz, 1791, which productions are replete with references. M. Mureau de Lasarthe sur *Monstruosities*, may be consulted with advantage; and also Regnault sur les *Monstres ou les ecarts de la nature produit, soit dans l'espece humaine, soit parmilles quadrupedes*, &c. en planches coloriées, folio, Paris, 1775. *Mem de l'Acad. des. Sc.* 1733, 4, 8, 9. The various modern cyclopediæ contain many other references, but are silent on most of those now cited. For a complete refutation of the vulgar notion that monstrosities are caused by the mother's imagination, the reader may refer to Haller's *Op. Minora*, vol. iii.; the work of M. Geoffroy Saint-Hillaire; the *Dict. abrege des. Sc. Med.* 1824, art. *Monstruosities*; Rees' *Cyclopedia*, art. *Monster*; *Edinburgh Medical and Surgical Journal*, 1826, and Ryan's *Manual of Midwifery*, 1829. I mention these references, as the public in general, and a small portion of the profession, suppose the deformities or malformations of the foetus depend upon the influence of the mother's imagination. Various other theories have been formed by different philosophers and physiologists, but that of M. G. Saint-Hilaire is the best.

Hetradelphia.—These are seldom viable, as one infant only survives (Geoffroy). One of the rarest is the frontal hetradelphia of Home; one head only was attached by the vertex or crown to the head of an infant, and which survived for years. The majority are attached by the sternum or abdomen, and the imperfect individual has all his organs, though deformed or atrophied. Sometimes the head or superior extremities are wanting. In these cases an operation is not justifiable, as the organs and vessels of the one body are intimately connected with those of the other. I have been informed of a singular example of this kind, by Dr. Shireff of Deptford, to whom the particulars were communicated by his brother-in-law, a captain in the East India Company's service. This gentleman saw a full-grown Chinese of the male sex, with the body of an infant projecting from the chest at the lower extremity of the sternum. All parts were perfect below the neck; and both individuals evacuated the bowels and bladder simultaneously. This person was afterwards exhibited in London.

Enadelphia.—Examples of this monstrosity are on record, in which one infant was contained within the abdomen of another; and even that a new-born female infant had expelled another after birth (Schurig). When we recollect the size of the infantile uterus at birth, we can scarcely imagine the possibility of its containing an embryo; but if one were situated in the abdomen of the other, it might perhaps, though I think it most improbable, pass through the vagina, which at birth is so small as scarcely to admit a goose's quill, while the genital fissure is so closed, as with difficulty to admit the point of a common probe. Numerous examples are recorded of the existence of different parts of the remains of one foetus in the abdomen of another, and which remained in the male until the age of puberty or adolescence. Such was the case of Amedee Bisseu. The occurrence of such cases is

explained by the fact, that the parietes of the abdomen are some of the last parts developed in the embryo; and therefore, if one embryo fell into the open abdomen of another, it might be covered in by the abdominal walls.

In these cases, the presence of an embryo, or any part of its body in the abdomen, will not in general excite fatal inflammation; but as the person who contains it grows up, it is perhaps possible for him to evacuate it through the abdomen by ulceration, in the same manner as in the examples of extra-uterine pregnancies, of which many cases are authenticated. In the last mentioned cases, the foetus putrefies, the irritation caused by this process, and by the bones, inflames some of the abdominal viscera, and adhesion takes place at some point with the walls of the abdomen; ulceration follows, an aperture forms, and the foetal bones are successively expelled. I have quoted various examples of this kind.

M. Andral has seen the head of one foetus surmounting that of another; and also a tumour resembling an abdomen attached to a well-formed infant. In some cases there is but one head for two bodies (monocephaly), or a double head for one body (dicephaly), and lastly, the head and the body may be double.

M. Andral likewise observed, that when one head surmounted two bodies, it resulted from the fusion or union of two heads.

In some cases there are three or four supernumerary extremities, superior and inferior, and these have no fixed position, as they may be above or below, before or behind, or springing from the normal limbs. When the excessive parts are examined by dissection, they are found malformed, and are defective in bones, muscles, tendons, &c.

Meckel is of opinion, that monstrosities by excess of development are more frequently in the superior than in the inferior parts of the body. According to this distinguished author, there are more monstrosities of the female than of the opposite sex, as in eighty cases, sixty were feminine. It is also well known that certain vices of conformation are hereditary. Every obstetrician of practical experience can attest this fact. I have also given numerous examples in my works on midwifery and medical jurisprudence.

Monstrosities from defect of Development.—Foetuses have been observed which were deprived of the oesophagus, stomach, large intestines, diaphragm, urinary apparatus (Fleischmann), of the brain (anencephaly), of the head (acephaly), of the neck, thorax, superior and inferior extremities, genital organs, eyes, eyelids, nose, palate, ears, part of the heart, large vessels, &c. &c. There are also examples of divisions and unnatural openings of parts, which are ascribed by the moderns to arrest of development. Among these defects are included partial or total absence of the parietes or walls of the great cavities, hare-lip, cleft palate, hypospadias, epispadias, pleuro-spadias, union of the hands to the shoulders, or the feet to the pelvis or thigh bones.

Malformations also result from obliteration, or great contraction (atresy) of the natural apertures, as of the mouth, nostrils, eyelids, ears, frontal and maxillary sinuses, pupil, ventricles of the brain, anus, ure-

thra, vulva, &c. While others are caused by an unnatural reunion of parts, which are ordinarily distinct, as of the two eyes towards the middle of the face, (cyclops, cyclophy), of the ears, &c.

Lastly, there may be transposition of organs, as the heart in middle or right side of the thorax, the liver in the left side, or in the abdomen, and the large blood-vessels in unusual positions. Every part of the body may be defective or absent at birth, as I have most amply attested in the Lectures on *The Physical Education and Diseases of Children*, already quoted.

Contractions of Parts.—Of the Eyelids.—The eyelids may be nearly closed, or entirely united to each other at birth, so that vision may be diminished or destroyed.

The adhesion may be caused by a membrane, or by the immediate approximation of the free surfaces of the eyelids. In either case an operation should be performed immediately after the birth of the infant, so as to restore it one of the most valuable of the senses for the development of the intellectual faculties.

The division of the eyelids may be easily accomplished by passing a fine director in front of the eye, and incising the part on it with a scissors or bistoury; but great care must be taken not to wound the eye, or the lachrymal organs, as the result, in the latter event, would be a continual and involuntary discharge of tears, termed lachrymation.

The eyelids are to be kept separate by means of lint and simple cerate placed between them, with proper dressing, and a cold lotion should be applied.

When the eyelids adhere to each other the disease is termed ankyloblepharon, and, when adherent to the eye-ball, symblepharon. In the latter case great care must be taken in incising the adhesion, and in preventing reunion, by frequent injections, while some advise the eyelids to be repeatedly opened by an attendant during the first twenty-four hours after the operation, for the same purpose. I once operated upon a child aged six years who had partial occlusion of the eyelids, caused by a burn. The result was successful.

Sir James Murray, of Dublin, operated with the same effect in the case of another female child, arising from the same cause, whose brow and cheek grew together into one smooth uniform surface of flesh and skin; there was no trace of the eye, nor even of the hollow in which it had been. She had been in this state for fourteen months. "I explained to her father that the eye-ball was so much in motion, so covered with liquid, and so well defended, that it was most probable it had not adhered to the flesh above it; that it was yet safe in the socket, and that an operation would ascertain the fact. After a month he consented. I cut down over it, fibre after fibre, dividing an incredible depth of flesh. I reached at length the beautiful blue eye, deep, and weak, and buried; it glimmered by the stimulus of light like that of a new-born infant. I prevented the re-adhesion of the separated surfaces by proper dressings.

"The fine little girl is now as well as ever, and fully enjoys the benefit and beauty of that eye, which, for fifteen months, had been deeply hidden from the light, unseeing and unseen."

Dr. Mackenzie, in his elaborate work on Diseases of the Eye, agrees with Celsus as to the uncertainty of the operation, and the constant recurrence of the disease. Indeed, such is the general opinion; but there are many exceptions.—See Houston's Manual of Diseases of the Eye. Second edition. 1840.

The best account of Malformations of the Eye, and its primitive deformities, in man and animals, is, so far as I have seen, that of Dr. Seiler of Dresden, 1833, from which I quoted largely in the Lectures above cited, entitled *Beobachtungen, Ursprungliche, Bildungsfehler, &c.*

Lastly, when there is adhesion between the eyelid and the transparent cornea, vision cannot be established, or restored by any operation, or by any plan of treatment, because the lucid cornea is rendered opaque by the inflammation which caused the adhesion.

I shall notice closure of the pupil in a future paragraph.

Congenital Contraction of the Nostrils.—This disease is observed very rarely in new-born infants; but it may greatly impede respiration, and prevent the suction of the nipple. In some cases an incision is required, and the nostril must be dilated with lint, or with a canula.

If hæmorrhage supervene, the nostril should be tightly plugged with lint, and this substance left in its place, until suppuration commences, when it should be carefully removed.

Congenital Contraction of the Mouth—This malformation will require an incision, so as to enlarge the opening to its normal or natural extent; and due care must be taken not to wound the coronary arteries.

The lips of the wound should be kept apart by simple dressing, and by adhesive plaister, and, according to some, by silver plates, to which ligatures are attached, and secured at the back of the head. The first method is, however, quite sufficient.

Congenital Contraction of the External Ear at Birth.—This narrowness may be caused by the prolongation and approximation of the anti-helix, tragus, and antitragus; while in other cases, the sides of the osseous canal so nearly approach each other, as only to admit the introduction of a very fine probe, or even needle.

In the first case, the contraction may be removed by excising the excessively developed part; but in the second, there is no remedy, and there must be incurable deafness.

Congenital Contraction of the Prepuce at Birth.—The closure of the prepuce may be so great, in some cases, as to prevent the flow of urine, and cause it to accumulate between the prepuce and the glans, or summit of the penis. This is usually discovered at the first visit paid by the obstetrician to the puerperal woman after delivery, on his inquiring whether the infant has evacuated the bladder or not.

I may observe that this disease is of frequent occurrence, for I have met with several examples of it in my own practice, which is by no means limited.

The indication of treatment is to excise the prepuce in the following manner: let a small director or probe be passed between the prepuce and glans, or summit of the penis, and an incision be made over it; or a bistoury may be introduced, and the incision made from below upwards; and in either case the lips of the little wound should be kept

separated by means of adhesive plaister, and some mild dressing, and some mild mucilaginous fluid, as barley-water with gum acacia, given so as to act as a slight diuretic, so that there may be a discharge of urine two or three times in the day, which will necessarily prevent the reunion of the parts. I must here observe, that the prepuce should be drawn backwards as much as possible during either incision, so that only as small a portion of its double fold as possible, near the meatus urinarius or external orifice of the urethra, may be divided, a suggestion and an improvement in this important operation, which I first made, as recorded by Professor Cooper in his truly valuable *Surgical Dictionary*, 1839, under the term *Phymosis*. The former operations were barbarous, most unscientific, and painful, and in general useless. The operation of circumcision might likewise be performed in some forms of this disease.

Contraction of the Urethra.—The orifice of the urethra is sometimes adherent, or closed by a membrane, the infant cannot evacuate the bladder, and then a slight incision will be necessary, after which the urine will in general flow very freely. A small pledget of oiled lint, or a piece of wax bougie, may be introduced once or twice a day, and the nurse cautioned to remove it whenever the infant becomes uneasy, or evinces a desire to evacuate the bladder.

Congenital Contraction of the Vulva.—This disease rarely requires an operation during infancy or childhood, as there is generally a sufficient aperture opposite the orifice of the urethra to allow the escape of the urine. But if the disease be allowed to continue until the age of puberty, the menses could not escape, and there would be an impediment to reproduction, as well as to parturition.

To prevent these consequences, an incision is made in early infancy, and the divided parts kept separate by simple dressing. I must here remark, that cohesion of the labia is common to infants who are not washed daily, and whose parts become ulcerated and adherent, and such cases are of frequent occurrence among the poor, who apply for advice at our hospitals and dispensaries.

When the cohesion is recently formed, it may be removed by making gentle pressure on both labia simultaneously, they may or will be separated, and then some simple dressing applied to prevent reunion.

Congenital Contraction of the Vagina.—This disease is rarely discovered during infancy, and not until the age of puberty, when the absence of the menses may lead to its detection. It may require incision, and the use of graduated bougies, for its removal; and it may be incurable in some cases.

Congenital Contraction of the Rectum.—This disease may be removed by introducing pledgets of oiled lint, or bougies; but in some cases an incision will be necessary.

Congenital Contraction of the Anus may be treated in the same manner as the last disease.

Besides the contractions of all the passages now described, there may be *complete occlusion or imperforation* of any one of them, and these I shall now briefly enumerate, on scientific as well as practical principles.

There may be occlusion of the pupils, eyelids, nostrils, mouth, ears,

prepuce, urethra, vulva, vagina, rectum, and anus; and these will require incision and dilatation to the natural extent.

The only one of these occlusions which deserves particular notice is that of the pupils.

Occlusion of the Pupils.—This is caused by the persistence of the pupillary membrane, or by intra-uterine inflammation of the iris, followed by the effusion of blood, or of coagulable lymph, before or after birth.

When the pupillary membrane impedes vision, no operation is necessary, as the membrane speedily disappears after birth, in most cases.

Iritis, at or soon after birth, is to be treated upon established principles. The brow round the affected eye should be rubbed, once, twice, or oftener daily, according to the vigour of the infant, the urgency of the symptoms, and progress of the disease, with belladonna, in the following proportions:—

℞. Extracti belladonnæ, gr. j—ij—iij; olei camphorati, ʒj—ij—iij.

Fricetur, ʒj vel ʒss, circa oculum, secundis vel tertiis horis.

Twenty or thirty drops of this embrocation should be rubbed round the affected eye, every two or three hours.

The following ointment, in the proportion of the size of a garden pea, may be used as frequently, under the same circumstances:—

℞. Extracti belladonnæ, gr. j—ij—iij; ung. hydrarg. fort. ʒj.

The young medical practitioner must remember, that both the embrocation and ointment are most powerful and efficacious remedies, but must be used with the greatest caution in cases of young infants.

Preternatural Adhesion of Organs at Birth.—There may be adhesion of the tongue to the gums or cheeks, or to the vault of the palate (Lapier, Levret, Bunel), shortness or excessive length of the filet of the tongue, adhesion of the penis to the scrotum, and of the fingers and toes to each other. The parts must be separated by incision, simple dressing, and cold lotions, with purgatives employed, and the cases treated upon established principles.

Tongue-tie.—The frænum or filet of the tongue is too short, or when it extends towards the tip of the tongue, the infant cannot suck properly, and makes a peculiar noise, and it cannot speak distinctly at the usual age. The earlier the operation is performed the better. The infant's head, arms, and lower extremities are to be held, the operator then introduces the index finger of the left hand into the mouth, depresses the lower jaw, carries the point of the finger to the root of the tongue, and by the side of the frænum. He then introduces the blunt side of a sharp scissors, and divides the frænum in the middle. He should avoid cutting too near the root of the tongue, lest he wound the ranine arteries or veins, and cause fatal hæmorrhage (Petit), or free the tongue so much as to permit its retroversion, which would cause suffocation (Petit, Levret).

When the frænum is too short it may cause stuttering, or irregular articulation, when the division of the filet or tie will facilitate a cure. This was the result in the case of a boy aged nine years, and of a girl aged thirteen, in which I operated. I have, however, more frequently found the operation completely fail. I was requested by the late Mr.

Warden of Limehouse, to see a girl aged twelve years, whose articulation was very indistinct, and whose frœnum was very thick and short from the period of birth. There was no operation performed, as success could not be promised.

Preternatural Divisions of Organs—Breaches of Continuity.—Amongst these are divisions of the bony and soft palate, of the upper lip (hare-lip), hypospadias, or opening of the urethra on its under surface, epispadias, or opening of the same canal on its upper surface, and pleurospadias, or opening of the canal on its lateral surface; in all of which the usual aperture at the extremity of the penis is generally obliterated. The effects of the last three diseases, at the adult age, on generation and paternity, I have fully described in another work—*Manual of Medical Jurisprudence*, 1836.

If a portion of the bony palate is wanting there is no remedy, except at the adult age, when an artificial substitute, composed of either gold or silver, may be worn with advantage. I have, however, seen cases in which such instruments could not be employed. In some cases in which the soft palate was cleft, the edges of the divided parts have been incised, and then brought in contact by two or three points of suture, and perfect union accomplished. Such was the result in France in twenty-two cases out of forty.—*Journ. Analytique*, Avril, 1828. This operation is termed *Staphyloraphy*.

Hare-lip.—When this disease prevents suction, it is proposed by many to incise the edges, and apply sutures, in a few weeks after birth, while others delay the operation until the fifth or sixth year of age.

The operation consists in separating the lips from the gums, in incising their edges with a scissors or bistoury, by keeping them in contact by passing two or three needles through them, and twisting a waxed ligature round each needle; and, lastly, adhesive plaister, a bandage, and cold lotion are applied.

When the infant is put to bed, its head should be elevated, so that if any hæmorrhage occur, it may be readily observed.

The needles should not be withdrawn until the cicatrization or healing is complete, for if removed too soon, the parts may separate.

Hypospadias—Epispadias—Pleurospadias.—In these cases the openings may occur at any part of the penis, from its extremity to the scrotum, and the urine escapes through these preternatural apertures, the urethra above them being usually impervious.

The treatment consists in opening the urethra, from its external extremity to the unnatural aperture, by means of a lancet, small trocar, or sharpened sound, passing a fine catheter through the perforation into the bladder, and touching the edges of the unnatural opening with caustic, and then allowing them to heal.

If the catheter cause much irritation, it must be frequently withdrawn, fomentations and warm-baths employed, with mucilaginous drinks and ligatures, and the instrument again introduced.

Fractures and Wounds of the Fœtus in Utero.—It is recorded, but I have never observed such cases, that the bones of the fœtus may be fractured during intra-uterine existence, either by external injuries

inflicted on the abdomen of the mother, such as falls, blows, &c., or by a convulsive motion of the muscles of the foetus, when the bones are diseased. *Mollities* or *fragilitas ossium*, the contamination of syphilis or cancer, will often predispose to fracture in the adult, and consequently in the foetus. The latter cause will explain the existence of intra-uterine fractures, erroneously supposed to be produced by the imagination of the mother. The cases recorded by Malebranche and others, of infants born with different fractures, and ascribed to the terror of the mother, caused by having witnessed the mutilation of malefactors on the wheel, were satisfactorily explicable by the preceding cause. Women are often frightened in our times, but they seldom bring forth infants with fractures. Infants have been born with ununited fractures of all the long bones. (Amand, Chaussier).

It is on record that infants have also been born with consolidated fractures. Fractures may likewise be inflicted by the bones of the pelvis, through which the infant has to pass into the world, or by instrumental or manual operations. The bones of the cranium, lower jaw, clavicle, superior and inferior extremities, the ribs and bones of the pelvis, have been fractured by the preceding causes. Cheselden described fracture of the ribs caused by nurses. Numerous other distinguished obstetricians and surgeons have observed fractures caused by the forceps, lever, or by the operation of version. These fractures are to be treated on ordinary principles.

It has been urged that the amniotic fluid or water which surrounds the foetus in utero, would prevent a blow on the abdomen from fracturing any of the bones of the foetus at all; but it is to be recollected that this fluid varies very considerably in quantity, from one or more pints to half a wine-glassful, and consequently in the latter case, could not possibly preserve the foetus in the latter months of uterine gestation, when it is in contact with the walls of the womb and those of the abdomen, from fracture. Every medical obstetrician has met with what midwives call "dry labour," in which there is scarcely any aqueous or amniotic discharge from the womb during delivery, and in such cases blows or other injuries on the abdomen of a woman or inferior animal, in the last months of pregnancy, might, in my opinion, cause fracture of the bones of the foetus in utero.

Dr. Blundell, Dr. Merriman, and myself, were once called on to give evidence in a case of this kind, at one of the superior law courts at Westminster, in which it was alleged, that a kick inflicted on the belly of a sow in the last month of gestation, had fractured the skull of one of her young, and induced premature delivery. None of us could give evidence as regarded such animals, or even the human subject, from personal observation or experience; and a verdict was given against the defendant for damages 200*l*.

Many students and inexperienced medical practitioners, would, at first sight, consider it of no importance to notice the preceding subject, and would forget that it might be a matter of criminal investigation in our courts of justice.

It is, however, very clear, that contused and lacerated wounds, frac-

tures, and luxations or dislocations, are more commonly the result of spontaneous or artificial delivery; but still might be, in my opinion, inflicted on the foetus in the womb.

Wounds of different parts of the foetus may be inflicted by projecting bones, when the maternal pelvis is deformed, or by artificial delivery. Various obstetric writers attest examples of this kind. (Mauriceau, Delamotte, Saviard, Amand, &c. &c.)

The foetus in utero has been wounded in criminal attempts to procure abortion. It has also been wounded after birth, with the same intent, by acupuncture, through the nasal fossæ, the orbit, the fontanel, the temple, the ear, the neck, the axillæ, or the region of the heart, the anus, abdomen, vagina, &c. In such cases the traces of blood will alone lead to discovery. Such cases are recorded in the works on forensic medicine. (See *Author's Manual*, 1836).

Intra-uterine Amputation of the Superior and Inferior Extremities, has been described by living authors. Dr. Montgomery has published "Observations on the spontaneous Amputation of the Limbs of the Foetus in Utero, with an Attempt to explain the occasional Cause of its Production. *Dublin Med. Journ.*, 1832, vol. i., and *London Med. and Surg. Journ.*, 1834, vol. ii. In Dr. M.'s case the foot was amputated above the ankle, and was found, after the birth of the infant, in the vagina. A case, precisely similar, was recorded by Mr. Watkinson, in the *Lond. Med. and Phys. Journ.*, v. liv. M. Chaussier relates two cases in which separation of the fore-arm had taken place before birth. Mr. Tyson, West of Alford, Lincolnshire, favoured me with an account of a case in which the leg had been amputated in the womb, about an inch and a half below the knee. Dr. Thynne examined the stump, which was nearly healed, but the leg was not evacuated while the woman remained in the Westminster Lying-in Hospital, where she had been attended, in 1805, by Mr. West. *London Med. and Surg. Journ.* 1832, p. 811.

Congenital Division of the Parietes of the Thorax, Abdomen, and Genital Organs.—The records of medicine afford examples of absence of the anterior wall of the chest and abdomen, and the viscera floated in the amniotic fluid (Fried). The osseous part only was wanting in other cases (Adelon), and the heart has been seen covered by the skin only (Duges). I have seen two infants whose abdominal viscera were covered by skin alone at birth. Both were born dead. My friend, Mr. Hughes of Holborn, had attended at the birth of one of them, and has it preserved. MM. Capuron and Sedillot, and Borrel, record similar cases.

The hypogastric region often presents a red, fungous, painful tumour, which is the bladder protruding through the abdominal parietes. This is most common in males, and has been termed exstrophy. The umbilical cord is inserted near this tumour, the orifices of the ureters are apparent, the pubic bones are separated, the cavernous bodies are distinct, the urethra opens on its superior surface, so that the penis represents a deep groove (*epispadias*). Some cases of distention with danger of rupture of the bladder, are supposed to be the intra-uterine cause of this deformity, (Wrisberg, Chaussier, Vrolick). It does not prevent the infant from living, but may disqualify the male for generation.

With regard to the treatment of this deformity, little can be done except preventing the constant discharge of urine, by means of a compress and other contrivances.

Congenital Excesses of Parts.—The most frequent excesses of parts are supernumerary fingers and toes, different tumours and spots on the skin; prolongation of the superior eyelid, of the tongue, of the prepuce, clitoris, and nymphæ.

Supernumerary Fingers and Toes.—Infants are sometimes born who have upon one hand or foot, or upon both, six, seven, eight, and even ten fingers and toes (Andral). This vice of conformation is often hereditary, many proofs of which I have given in another work—*A Manual of Medical Jurisprudence*, 1836. In some cases the additional parts are properly articulated, while in others they are attached by a fleshy pedicle, and are entirely immoveable. It may happen that the finger is not entire, but results from a bifurcation of the phalanx (bone) of a finger or thumb, and is then imperfect.

Supernumerary fingers always require to be amputated; and if articulated, the usual operation is to be performed; but when attached by a fleshy pedicle, this is to be divided with a bistoury or scissors.

It is to be borne in mind, that the removal of a second thumb, or any injury about this part, is often followed by trismus or tetanus, although neither disease succeeds the removal of a supernumerary finger. This is as yet more inexplicable, as when there is bifurcation of a phalanx, or bone of the finger, the imperfect part may be removed with safety by resection.

Tumours and Spots on the Skin.—Infants are sometimes born with tumours and spots of different sizes and colours on the skin, which the vulgar very erroneously attribute to the unsatisfied desires and longings of women during pregnancy. This is now an exploded opinion, as every pregnant woman may have desires or longings ungratified; and many are subjected to the greatest frights and injuries, who still bring forth perfect infants, so that the supposed cause is not followed by the effect.

When tumours are connected by means of a fleshy pedicle or band, to the skin, they are readily separated by means of a ligature, or a cutting instrument; but those attached by a large or broad base, must be removed with caution, as the wound may bleed very profusely.

Red, violet, or bluish spots, called *nævi materni*, or mother's marks, are said by M. Duges to arise from a morbid state of the capillaries of the skin, and that they often degenerate into fungus hæmatodes; but this, I believe, is very seldom the case. There is, perhaps, no part of the external surface of the body on which *nævi* or mother's marks may not appear, and when they are flat, and without turgescence, no treatment is necessary; but when they are prominent, and likely to enlarge, they may be compressed or extirpated. In such cases, vaccination, nitric acid, nitrate of silver are applied, and a needle armed with a double ligature passed through the diseased part, which is tied in opposite directions. The different operations are described in all standard works on surgery, and need no further description in these pages.

Prolongation of the Superior Eyelids.—When this exists, the globe of

the eye is constantly covered, and the infant is deprived of sight, when the excessive growth appears on both sides. This is a very rare occurrence. The treatment consists in the use of stimulant applications to the affected eyelid, and, when these fail, the incision of a portion of the skin over the affected part, and the insertion of a suture (stitch) or two may become necessary.

Prolongation of the Tongue is of still more rare occurrence. When it exists, it impedes suction and deglutition, and causes a flow of saliva from the mouth. It will also retard the articulation. It arises from a debility of the muscles, and this may sometimes be overcome, by applying common table salt, alum, ginger, or pepper, to the affected part. If these remedies should fail, excision is advised; but I have never observed a case, or heard of one, in which it was necessary.

Prolongation of the Prepuce impedes the evacuation of the urine, and causes inflammation, which may be followed by gangrene, sloughing, and death. Circumcision is advised in such cases; but it ought never to be indiscriminately practised on all infants, because in many it is wholly unnecessary. In most cases in which it is necessary, blood vessels must be divided, and the loss of blood, technically termed hæmorrhage, is so profuse as to require the application of the actual cautery, or iron heated to redness, for its suppression. Few adults would suffer this application to themselves; and I leave them to judge what it must be in cases of newly-born infants. Every practical obstetrician well knows, that very slight causes produce convulsions and death in tender infants, without the application of the actual cautery, or red hot iron.

It has been proposed by M. Lisfranc and others to lay hold of the elongated prepuce with a forceps, draw it forwards, and then incise it; and if hæmorrhage occur, to arrest it by means of the actual cautery.

I have invariably found that slitting the prepuce with a bistoury from below upwards, and introducing simple dressing three times a day to prevent re-union, was quite successful, and free from all danger to the newly-born infant. The incision should be very small, but sufficient to allow the urine to escape. I know two infants and one child upon whom I performed the operation in a few hours after birth, and they now suffer no inconvenience on evacuating the bladder.

Defects of Parts.—We sometimes find absence of the rectum, or of some other portion of the intestinal canal. In the first case it has been proposed to form an artificial anus, and M. Duret succeeded by this method. The infant was cured in seven days.

Deviations of Parts.—The most frequent deviations of parts are strabismus or squinting, inclination of the head and neck to one side, and the different forms of club-foot, and other deformities.

Strabismus is curable in certain cases, by dividing one of the muscles of the eye, and in other cases by wearing goggles or spectacles, so covered as to compel the child to look in the opposite side of the squint. Dr. Dieffenbeck was the first to divide the muscle, and the operation is instantaneously followed by cure. It is now performed by surgeons in all countries.

Inclination of the Head and Neck to either side is caused by debility of certain muscles, and is to be remedied by the nurse applying the infant to the breast, and when looking at objects, so that it will turn the head in the opposite direction to the affected side. It may require the division of the sterno-cleido mastoideus muscle.

Club Foot, Bent Knee, Wry Neck, Spinal and other Deformities.—These malformations are at length consigned to the medical profession, and are no longer in the hands of mechanics and empirics. They are, in general, cured by safe and mild operations, aided, in some cases, by the use of properly constructed instruments.

The term Orthopædia is applied to the cure of deformities, and is now well understood, and the practices highly beneficial to the afflicted.

A great improvement has been made during the last century in Orthopædia, or in the cure of club-foot, bent knee, wry neck, spinal and other deformities; and a vast number of these diseases are now removed by operations, aided by mechanical contrivances. Such cases are no longer confided to the care of mechanics, who are ignorant of the anatomy and physiology of the human body, and especially of the deformed parts.

About the close of the last century, Venel, a Swiss physician, directed his attention to the nature and treatment of the deformities, and invented several mechanical instruments with which he accomplished many cures of cases in which others had failed.

M. Jaccard and M. D'yvernois of Paris, and Dr. Heine of Wurtzburg, improved the new instrument, and the latter established an Orthopædic institution, the first in Germany, in 1812.

In 1822 the Royal College of Surgeons, London, offered a prize for the best essay "On the Advantages of Mechanical Means in the Treatment of Spinal Curvature," and the successful essayists were Mr. Shaw and Mr. Bampfield. Several Orthopædic establishments were subsequently founded in France and Germany. The Academy of Sciences in France now offered a prize of 10,000 francs for the best essay on deformities, and this was awarded to M. Jules Guerin, and M. Bouvier; the former of whom has since established one of the best Orthopædic institutions in Europe, to which persons of all countries resort for relief.

The works of Shaw, Bampfield, Harrison, Amesbury, Beale, Krauss, Little, &c. in this country have greatly advanced this part of science.

The late Dr. Harrison left 3000*l.* towards the foundation of an hospital for the treatment of deformities; and a similar institution in the east end of London has been lately established by Dr. Little. There is also the Blenheim-street Dispensary, at which Dr. Krauss is Orthopædic physician—a gentleman who has been most successful in curing deformities—many proofs of which are given in his interesting work, and he exhibited some of his patients before our medical societies.

The first great improvement in the cure of club-foot was the division of certain tendons, as practised in Germany by Dr. Thilemius and Laurenz, in 1784; by Dr. Sartorius, of Nassau, 1805; by Michaelis, of Marburg, in 1809; and by Delpech, of Montpellier, in 1816; since

which period the operation has been frequently performed, and especially by Dr. Krauss, in London.

Deformities of the limbs are often caused by shortening of the muscles and their tendons, called sinews and leaders. The chief point is to lengthen the muscles, which is done by dividing the tendons, whose elongation is produced by the intervening substance which forms between their divided extremities. The operation is performed as follows:—a narrow knife is passed on the side of the tendon, which is cut through without wounding the investing skin. The operation is performed in a quarter of a minute, and causes very little pain. A few drops of blood only escape from the wound, which is healed in two or three days. The intermediate space between the divided ends of the tendon is filled up from the eighth to the fourteenth day.

The unpleasant deformity called club-foot, first led to the division of the tendons, and hundreds have now been cured of their distortions by this safe and simple expedient.

Dr. Krauss has cured several persons at the adult age whose deformities had been congenital, amongst which were the varied forms of club-foot, contracted knee and wrist, and spinal deformities. I know a gentleman, aged twenty-two years, who was completely cured of the worst form of club-foot, which had been congenital.

Club Foot is easily rectified, in early infancy by bandages and pieces of paste-board, and will be speedily cured in the majority of cases. Splints and iron machinery are scarcely ever necessary when bandaging is applied soon after birth, as the bones are but partially ossified, the cartilages soft, and all the parts are readily reducible to the natural position. There are, however, certain malformations of the bones, which cannot be remedied; but such cases are, happily, of rare occurrence.

Contractions of the Knee, Elbow, Wrist, Ankle, Fingers, and Toes, caused by white swelling or rheumatism, may be often cured by the internal and external use of iodine, and more especially of the iodide formerly called the hydriodate of potass, as I have repeatedly observed in hospital and dispensary, as well as private practice, for some years past. I have repeatedly succeeded by means of these remedies in cases which were declared incurable by our most eminent surgeons.

In one case, it was decreed at one of our large hospitals, to amputate the leg for white swelling of the ankle, of a boy aged ten years. He was, however, completely cured with the iodide of potass in four months.

In a second case, of a youth aged fourteen years, whose right leg was nearly at right angles with his thigh, the disease was declared incurable by surgeons of the highest eminence. The iodide of potass was employed for nine months, both internally and externally; absorption of the enlarged joint was gradually effected, and the diseased limb astonishingly straightened, while the general health was greatly improved.

In a third case, the elbow-joints were enlarged, the forearms permanently bent on the arms, the wrist joints very much enlarged and immoveable, and the knuckles and middle joints of the fingers very much enlarged and nearly motionless. The woman was a patient of mine at

the Metropolitan Free Hospital, 1839. She ascribed her disease to rheumatism, but admitted that in early life she had been infected with syphilis. I ordered her the iodide of potass, both internally and locally, with the compound calomel pill, in alterative doses, which in four months nearly effected a cure, and enabled her to use her arms very freely.

I might multiply cases of this kind, but shall leave the reader, however sceptical or inexperienced, to try the remedies I have used fairly, and then judge for himself. If he succeed in saving limbs and removing deformities, that formerly were supposed to require amputation, as I have repeatedly done, he must agree with me in opinion, that even a partially deformed limb is, upon the whole, better than no limb at all.

Nodes and exostoses will be relieved by the same remedies when all other means have failed.

But there are various deformities of the joints just mentioned in which all remedies, except division of the tendons must fail. It is, however, most consoling to know, that such cases may be relieved or cured by operation. Dr. Krauss gives the histories of contracted knee, foot, fingers, and toes, which he cured by division of the tendons, as well as of congenital wry-neck, and that caused by burns, by division of the sterno-cleido-mastoideus muscle, or of the skin in the latter case. Every educated medical practitioner well knows that many of such cases are incurable, in consequence of intra-uterine or congenital vice of conformation, or of congenital malformation.

Congenital Deformities of the Spine are of comparatively rare occurrence, and are now treated scientifically and successfully. The chief means of treatment are mechanical extension of the spine with proper muscular exercise; and modern orthopædists employ different artificial contrivances for the latter purpose. The late Dr. Harrison extended the spine, applied shields and corsets, and kept the patient for months and even years in the horizontal posture. I, in common with most, supposed that this long confinement would prove injurious to the general health, but I had repeatedly observed patients who absolutely improved under it, and many were cured who had been despaired of by the most eminent physicians and surgeons. But most modern orthopædists now use a variety of gymnastic exercises, and only confine the patient for a certain number of hours to the recumbent position.

It is most consoling to know, that incurable distortions of the spine are now very rare, if the treatment be commenced during infancy or childhood; and many persons are even cured from puberty to the adult age. Parents need no longer employ mechanics, but obtain the aid of scientific physicians and surgeons, who will in general cure their children of spinal and other deformities. It is highly gratifying to observe the rapid advance of orthopædic establishments in this metropolis during the last ten years, prior to which the poor had no resource, as cases of deformities were not admitted into our great public hospitals. But I must here observe, that the Infirmary for Spinal and other Deformities, founded by the late Dr. Harrison, and now under the care of his colleague, Dr. Serny, in the west end, near the New Road, Regent's Park, that of Blenheim Street, Oxford Street, that of Dr. Little, in the east end of London, and

of Dr. Kingdon, in Surrey, are calculated to remove a vast deal of human suffering, and to cure a number of deformities, which hitherto were too generally deemed incurable.

Since the preceding remarks were written, a most extraordinary case has been reported to the Academy of Sciences in Paris, of which the following are the particulars:—M. Jules Guerin, the celebrated orthopædist, of whom I have already made honourable mention, lately read a paper on deformities of the superior and inferior limbs, and of the bones of the trunk, before the Academy. These arose from a shock given to the nervous system in infancy, which produced contractions of almost all parts of the body. Extension by mechanical means had been tried, without the slightest beneficial result.

It was then announced in Paris, that M. Guerin intended, on a certain day, to divide several muscles of a patient, in his unequalled orthopædic establishment. A vast number of the most eminent of the faculty in Paris, and of foreigners in that capital, attended. M. Guerin proceeded to operate, and divided no less than forty-two muscles by only twenty incisions, in one hour, and with very little pain to the patient; and this, every educated medical practitioner can understand, however frightful it may appear to the general reader.

The following were the muscles divided:—

On the Trunk.—The great pectoral.

At the Elbows.—The two bicipetes, the two pronators, the two radials, the two superficial flexors, and the two small palmars.

On the Fore-arms.—The tendons of the two anterior cubitals, the four great and small palmars, and the two great abductors of the thumb.

At the Knees. The two sartorii, the two crural bicipetes, the two semi-membranous, as well as semi-tendinous, and inner recti, with the two external lateral ligaments, and the fascia lata.

At the Feet.—The tendons of Achilles, the two anterior crurals, the two common extensors, the two extensors of the great toe, and the two peroneals.

On the third day, the openings on the skin were healed, and the superior and inferior extremities were nearly restored to their natural position.

This case clearly shows the rapid advance (in 1840) of orthopædy, or that portion of medical science and practice, for the relief of human deformities.

Diseases with which Infants may be affected at Birth.—These are syphilis, cyanose, cyanopathy, or blue skin, congenital hydrocephalus, hydrorachitis, hydrothorax, ascites, hydrocele, infiltration of the genital organs, umbilical and inguinal hernia, and encephalocele, or hernia of the brain.

Syphilis.—An infant may be infected with syphilis at the time of conception, even although neither parent has primary sores (see p. 300), or during parturition, while it is passing through the genital organs, when the mother has chancre, and lastly, by the milk of the nurse in some cases.

The symptoms may be evident at birth, or may not manifest themselves for days, weeks, or months afterwards. They consist, as in the

adult, of pustules, scaly eruptions, excoriations, chancres, vegetations, tumours, blotches, enlarged lymphatic glands in different parts of the body, ulcers of the genitals, groins, eyes, nose, mouth, ophthalmia, coryza, hoarseness, discharges, &c.

These symptoms may appear upon all parts of the body, but are more frequently observed about the region of the anus, the genital organs, the groins, chest, body, thighs, and limbs, the eyes, the mouth, and nose. The infant appears decrepid, emaciated, and shrivelled; the cuticle may be partially separated; there may be want of the hair or nails, or the latter may be imperfectly formed, while the superior and inferior extremities will be weak or paralysed.

All the mucous membranes may be affected by venereal disease, and especially that portion which lines the nostrils and throat, and in such cases the infant will snuffle, cannot suck, or will be hoarse; the respiration will be more or less impeded, the nostrils will be dry or filled with mucosity, or ulcerated and filled with pus, or the cheek may be ulcerated, or become gangrenous.

In a moral and legal view, no man or woman contaminated with venereal disease ought to marry or have children, but it often happens that persons suppose themselves cured, and are told so by their medical attendants, before entering into matrimonial contracts, although the disease may appear afterwards in a secondary form, as eruptions, pains in the bones, falling off of the hair, &c.; or may not at all appear, although infants may be born dead and decomposed, as already stated, born with eruptions, or these appear days, weeks, or months after birth. If there be no symptom of disease at the time of marriage, and as parties take each other "for better or for worse, in sickness and in health," and as not one in twenty is really healthful, there should be no crimination or recrimination, in strict justice, on account of disease of whatever kind, which may appear after marriage.

The venereal disease, in a primary or secondary form, may be transmitted by either parent, to the embryo, at the moment of conception. There are different degrees of parental contamination, which will be followed by different results. When the parental constitution is much infected with secondary syphilis, the movements of the fœtus will diminish about the sixth month, continue to become weaker, or entirely cease about the seventh, and the infant will be born dead, and partially decomposed, between the seventh and eighth month. This result may occur in several pregnancies; and I have known a respectable woman who brought forth twelve infants in this manner.

When there is a less degree of parental infection, the infant may be born alive, but thin, shrivelled, and partially covered with some kind of the many forms of cutaneous eruption, generally about the genitals and anus. In such cases, mercury, sarsaparilla, and the iodide of potass, must be administered, both to mother and infant, when a cure will, in general, be very speedily effected.

When the parental constitution is but slightly diseased, the infant may be born in apparent good health, but in a few days, weeks, or months, it will present syphilitic symptoms, which will only yield to mercury and other proper medicines.

It is also important to state, that when the parental constitution is very strongly infected with syphilis, at the time of conception, there is no use in administering mercury or sarsaparilla to the mother, as the infant will be invariably born dead and decomposed, between the seventh and eighth month. I have been repeatedly consulted in cases of secondary syphilis, in which the women had used mercury and sarsaparilla for two or more months during pregnancy, but yet were delivered of dead and putrid infants. In many such cases I advised that cohabitation should be avoided for two or more months after delivery, during which both husbands and wives should be energetically treated for their diseases. At the end of such time they again cohabited, pregnancy speedily occurred, (for there is a great predisposition to it in such cases), and a living infant was born. In one case the lady had two dead infants previously to this plan of treatment, and she is now the mother of seven healthful children.

I cannot speak from sufficient experience as to the utility of treating the milder forms of syphilis which cause infants to be born with eruptions, or when these appear soon after birth; but in such cases, perhaps, a cure may be effected. Dr. Beatty of Dublin, (in 1792), subsequently Dr. Joseph Clarke of Dublin, Professor Hamilton of Edinburgh, Mr. Hey of Leeds, Mr. Lawrence, and most eminent physicians, are of opinion, that a husband who has secondary symptoms, may infect his wife and their offspring, several successive times. Mr. Abernethy held that the foetus in utero became infected with syphilis at the sixth month, as its motions then began to diminish; but this explanation is quite unsatisfactory; as one or both parents are affected with the venereal disease at the time of the mother's conception, and if the foetus be not contaminated at that period, or during the first six months, while supplied with blood by the mother, and surrounded with fluid and membranes, no explanation can satisfy any physiologist, that the poison should have lain dormant for such time, and then act on the new being. It is also well known, that putting both mother and father under the influence of mercury, any time after conception has occurred, when contaminated so as to produce the death and decomposition of the foetus, is of no avail, which would not be so had Mr. Abernethy's very extraordinary conclusion, in my opinion, been correct. (Lectures in the Lancet). I venture to assert that no modern and experienced obstetrician will agree to such a conclusion.

When a woman is infected with chancre or primary venereal ulcer any time after conception, and during pregnancy, the infant may escape contamination, as weeks or months may elapse before the secondary symptoms, which are constitutional, appear. But the next infant may be born dead, or affected with syphilis, in the degrees already described. When there are primary sores on the mother, the lips, eyes, nose, or genitals of the infant, may be infected during parturition; and if the lips be diseased, the nipple of the mother or nurse may become similarly affected. It is well known that the venereal disease may be communicated to a nurse by sores on the mouth of an infant or adult.

Mr. Hey of Leeds, published some valuable observations on this subject. He stated, that a woman who gained her living by drawing

the breasts of women after delivery, infected several, from ulcers on the angles of her lips. One woman was diseased in this manner, by the same nurse, according to his account, which I believe to be correct, from 1771 to 1775, and so were her infants.

A poor woman was employed to suckle an infant whose lips were affected with venereal sores. She applied it to her left breast only, and kept the right for her own offspring. A sore speedily appeared on the left breast, the glands under the arm enlarged, a venereal eruption speedily came out on the scalp, and sores developed on the genitals. The woman and her foster child were treated with mercury; but her own infant remained free from the disease. It therefore appears, that though a woman affected with secondary symptoms will infect an embryo at the time of conception, yet she will not an healthful infant at the breast, if she contract the disease, as in the above case, after the birth of such infant; so that syphilis cannot be communicated through the breast milk, under such circumstances. I must also observe, that the infant above alluded to, was transferred to another nurse, whom it also infected. The former nurse was supposed to be cured by mercury, but her next infant, though born apparently healthful, when three months old, became covered with a syphilitic eruption, which was cured by mercury. I need scarcely observe that it would be inhuman to compromise the health of a sound woman, by giving her an infected infant to nurse. But it is here, however, important to state, that unless the infant has primary sores on its lips or tongue, it will not infect any woman who suckles it, although it present the usual secondary symptoms of syphilis. It is also a fact, that when the mother or nurse labours under secondary symptoms as well as the infant, both must be cured by the usual remedies, which when judiciously employed cannot injure either the one or the other.

Lastly, it is highly gratifying to observe the extraordinary rapidity with which both mother and infant will be cured by mercury, sarsaparilla, and iodide of potass. There are, however, many cases wholly incurable. A great deal will depend upon the degree of infection, as well as upon the frequency in which the disease is superadded to the constitution by one or both parents.

Treatment.—Mercury, sarsaparilla, iodide of potass, nitric acid, mezezeon, &c., must be exhibited to the mother, and the first three medicines to the infant. If the remedies produce their usual effects on the mother, these will in general be transmitted through the breast milk, and cure the infant. But it is much safer to give the infant medicine. A grain of mercurial pill, or a twentieth part of a grain of calomel may be administered daily, in the syrup of sarsaparilla, or a grain of the iodide of potass may be added to an ounce of the latter, and a teaspoonful given two or three times a-day. Two or three grains of strong mercurial ointment may be also rubbed under either arm daily, at the same time.

In continental Europe it is common to apply a third or fourth of a grain of the hydrochloride, or muriate of gold and soda, mixed with starch or orrice-root powder, to the tongue or gums, every night, in bad cases. (See *Universal Pharmacopœia*, 3d edition, 1839, by the author).

But I have repeatedly found, that the more simple preparations of mercury administered to the mother and infant, generally and rapidly effect a complete cure; but every means must be used in extreme cases.

Cynopathy—Blue Disease—This arises from the persistence of the foramen ovale, or aperture between the right and left cavities of the heart, which is generally closed at birth. The skin is blue in consequence of the mixture of the black and red blood. A case is recorded in the *Journ. Analytique*, Oct. 1827, in which there was a total absence of the interventricular septum. The continuance of the ductus arteriosus, or if the aorta arise from the right ventricle, will cause the disease. M. Duges found the pulmonary artery arising from the left ventricle, and the aorta from the right. The infant had blue disease, and died on the fifth day. (*Op. supra cit. Nov. 1827*).

The blue colour of the skin is greatly increased by cough, or any exertion which accelerates or impedes the respiration; during which the heart beats forcibly, the pulse becomes frequent, irregular, intermittent, or feeble; there may be hæmorrhage from the lung, nose, &c.; or syncope, and the temperature of the body is often considerably increased. This unnatural state of the circulation injures the whole body, the infant is extremely feeble and delicate, and seldom arrives at the adult age.

This disease is incurable, and all that can be done is to relieve urgent symptoms.

Congenital Hydrocephalus is a rare disease, and sometimes almost appears to be hereditary. Underwood observed six infants of the same family who died at the age of two years, of hydrocephalus. G. Armstrong also considered it hereditary; but this opinion cannot be maintained. Infants affected with it seldom survive; yet Van Swieten describes two cases in which the patients arrived at the ages of thirty and forty-five years.

The disease is now generally cured by repeated tapping of the brain, an operation which I have fully described in another work, *The Physician's Vademecum*, 11th edition, 1837. This disease is often complicated with dropsy of the spine, termed hydrorachitis.

Hydrorachitis—Hydrorachis—Spina Bifida.—This disease consists in an effusion of fluid between the membranes which cover the spinal marrow, and line the spinal canal. When it is complicated with hydrocephalus, the disease is termed hydrocephalorachy.

Dropsy of the spine most commonly occurs in the lumbar region, or small of the back; but it may appear in any portion of the spine, from the nape of the neck to the coccyx.

Hydrorachitis presents itself as a soft tumour of varied size, opaque, white, transparent, blue, brown, or red; diminishable by pressure, and presenting a distinct fluctuation.

Infants affected with this disease are badly developed, as in many cases there is not only disease of the spinal marrow, but also of the brain. The tumour, generally, inflames, bursts, and is followed by paralysis of the lower half of the body, termed paraplegia; or the infant is seized with convulsions, and dies in a few days afterwards. There are, however, some rare exceptions, as infants affected with this disease

have survived to the middle period of life; but even in such cases, the individuals were extremely feeble and delicate, and wholly incapable of making ordinary exertion. Some have lived to the tenth year (Bonn), to the nineteenth (Copland, Hutchinson, and Jukes), to the adult age (Meckel and Warner); but death generally occurs before birth by the pressure caused in parturition, or soon afterwards; as it is almost impossible to save the tumour from compression, in dandling or holding the infant.

On autopsy, or the examination of the body after death, some one of the spinous or transverse processes or body of the vertebræ is diseased, imperfectly developed, or totally absent. When such morbid conditions exist, premature death is inevitable. The most careful mother or nurse may compress the tumour of the spine, cause it to inflame and burst, and the usual result will be the death of the infant.

I have observed many such cases in my own practice, as I have been attentive at dispensaries and hospitals, both as a student and officer, for the last twenty years.

I have only to add, in conclusion, the valuable observations of one of the most eminent physicians of France, which deserve attentive consideration and reflection from my readers.

M. Ollivier has quoted many authors, and repeatedly observed the following malformations:—1. total absence of the medulla spinalis, or spinal marrow; 2. total absence of the nervous system; 3. a simultaneous absence of the brain and spinal marrow; 4. an imperfect development of the latter; 5. a division of the spinal marrow into two halves, of a greater or less extent; 6. a double formation of the spinal marrow; 7. a variety in its length and thickness; and also the existence of a central cavity in its substance.—(*Traite de la Moelle Epiniere, &c.*) In such pathological conditions a cure cannot be effected, and premature death is inevitable. The disease is sometimes cured (Terris, Hoffman, Bozetti).

Dr. Bozetti repeatedly punctured the tumour forming spina bifida, and observed that the fluid which escaped was at first limpid, and after some time, viscid and plastic. He applied compression after each operation, and the affected parts of the spine became consolidated and semicartilaginous; while the lower limbs, which had been paralysed, regained their natural power. A piece of lead was placed over the affected part of the spine. A second case was treated in the same manner with success.

Dr. Trowbridge, of Watertown, proposed to apply a silver wire round the base of the tumour, so as to interrupt the circulation. He states that he succeeded in effecting cures by this method. Sir Astley Cooper was, perhaps, the first who proposed puncturing the tumour repeatedly, and then using compression.

Hydrothorax, or dropsy of the chest, is very rarely congenital, and is to be detected in the ordinary manner, and treated upon established principles.

MM. Billard and Duges have recorded cases of intra-uterine peritonitis, which might have terminated by dropsical effusion, as every scientific member of the medical profession must admit.

Baron Roux related the following most remarkable case of intra-uterine dropsy of the chest, abdomen, and external surface of the body, (anasarca) :—

A pregnant woman, aged thirty years, fell from a great height upon her abdomen, which was followed by pains in the small of the back, hypogastric region, and strangury, or violent pain on attempting to evacuate the bladder. She was seized with labour a month afterwards, which was impeded by a distended bladder. It was necessary to puncture the bladder, and six pints of urine escaped by the canula, as well as four by the urethra, or ordinary passage.

The woman was finally delivered of a dead infant, there was a pint of fluid in the chest, the same quantity in the abdomen, and general dropsy of the flesh, or external surface of the body, at the same time.—(Journ. de Med. Chir. Pharm., tom. xvii.)

Ascites, or dropsy of the abdomen, is also very rarely congenital. Mauriceau, Portal, Ollivier, Billard, and others, as well as myself, have described such cases. The records of obstetrics afford many examples. They are, however, of comparatively rare occurrence.

Hydrocele, or dropsy of the scrotum, commonly termed the purse, is of very frequent occurrence. It is generally cured by pouring cold water, morning and evening, from a small sized teapot, or jug, upon the affected part, and should this fail, by repeatedly puncturing the dropsical tumour with a fine acupuncture needle, and using cold applications at the same time. The particulars of the treatment are described in all the standard works on surgery.

Infiltration of the Genital Organs is often observed in infants of both sexes. The disease is most commonly caused by pressure during parturition, and more especially when the presentation is pedal, or popularly, when the infant is born by the feet. A cure is generally effected by the assiduous use of cold applications.

Hernia—Rupture.—Infants are sometimes born with the different species of rupture, but especially umbilical and inguinal, and all must be returned into the abdomen, and retained there by bandages. The affusion, or pouring on cold water, morning and evening, from a small mouthed vessel, will greatly assist in contracting the opening, and tend to diminish it. The application of a truss is necessary in most cases, and when properly constructed cannot, if the rupture be reduced, do any injury.

Junior practitioners must be very careful not to confound rupture with the natural descent of the testis, as is too often the case, as I have repeatedly witnessed.

Every person labouring under hernia, or rupture, whether young or old, is affected with a disease which may destroy life in a single day, though it often exists for many years with impunity.

It is therefore a medical axiom, that a hernia should be reduced, and a bandage or truss applied in every case; and when infants are affected, night and day, but never to cause pain, irritation, excoriation, or inflammation of the protruded portion of intestine, which may be rapidly followed by strangulation, gangrene, and death.

Umbilical Hernia, which is the most common, perhaps, should be

reduced, a piece of soap plaister applied over the navel, and a flannel or calico roller or bandage over it. These means usually effect a cure.

* *Inguinal Hernia* is often suspected in newly-born infants, when the testis is descending through the groin at or soon after birth, which it generally does previously. I have repeatedly witnessed great pressure used in such cases, with a view of reducing the supposed hernia. I shall not enter into further particulars, but advise the practitioner to examine both sides of the scrotum, so as to ascertain whether one or both testes have descended into their proper situations or not, before suspecting ruptures, and making pressure to prevent them from doing so.

Prolapsus Recti, or protrusion of the lower bowel, through the anus, is very rarely congenital, and should be reduced or restored to its natural situation, and retained there by a proper bandage. Astringent clysters are also beneficial.

Hepartomphalos, or protrusion of some part of the liver at the navel, has been described by Rockhalst, in 1768.

I may here be permitted to observe, that the term hernia literally means a protrusion of some of the organs, or parts in the great or deep seated cavities, viz. the head, chest, abdomen, or pelvis, through the external parts.

It therefore follows, that there may be protrusions of the viscera or organs in any of the deep seated cavities, which are technically termed herniæ, or ruptures. Those of the brain demand especial attention, while those of the thorax or chest are of extremely rare occurrence, and are seldom seen by medical practitioners. Soft tumours may exist in any part of the head, and sometimes are connected with the brain. When these exist with hydrocephalus, the disease is termed hydrencephalocoele.

Hydrencephalocoele, Cranial Tumours.—According to the celebrated Geoffroy St. Hilaire, the rupture of these tumours in the uterus causes monopsy, apnopsy, prodencephaly, and derencephaly. Cranial tumours have been punctured, but death speedily followed.—(Earle, Med. Chir. Trans. v. 7—Richter, Bilb. Chir.) Moderate compression and protection from external injury, may preserve life to the fiftieth year (Meckel), but death generally happens in infancy.

These tumours may co-exist with spina bifida, and there may be a communication between the fluids in the brain and spine. Senac recorded a case; while Lancisi, Mayer, and Bruner observed, that when the fluid escaped from the spine, the size of the head diminished.

Morgagni related a case, in which pressure made on the spinal tumour was distinctly felt at the anterior fontanelle, while pressure with the hand on the latter part caused the fluid to descend, and to distend the spinal tumour.—(De Sedibus et Causis Morb. 12, Bruner, Bertrandi, Mayer, Bonetus, Genga, Dubruil, Keelmaun, and others have related similar cases, and these are incurable.

It is, however, of great importance to distinguish between cranial tumours connected or not with the brain.

In 1825 I was consulted in the case of a young lady, aged eighteen years, well developed, and in good health. There was a tumour on the forehead, the size of a small teacup, which contained about five ounces

of fluid, and which was congenital. The good state of health, and a knowledge of the fact, that when such tumours communicate with the brain, the subject rarely arrives at the adult age, led me to believe that there was no communication in this case. On examining the frontal bone round the circumference of the tumour, it appeared depressed or absent, but pressure did not diminish the bulk of the diseased part. I determined to puncture the tumour, and ordered aperients and regimen. I punctured it with a common lancet, about five ounces of a viscid, gruel-like fluid escaped, which was extremely foetid. There was no tendency to syncope. I then examined the frontal bone with a probe, found it perfect, but partially absorbed. I injected a weak solution of the sulphate of zinc into the sac, as in cases of hydrocele, applied a compress and bandage. Adhesion took place, continued pressure caused absorption of the enlarged integuments, and a perfect cure was ultimately effected, as no trace of the disease remained.

When a student at Edinburgh, I saw an infant with a round tumour as large as an orange, on the root of the nose, which was repeatedly punctured, after consultation, by the late Mr. Wishart; it inflamed and burst, and the infant died. This sac or tumour was found to have communicated with the brain. The brain may partially protrude through any part of the skull, as the records of medicine amply testify. But such cases are of very rare occurrence.

Congenital Malformations and Diseases of the Skin.—There may be partial absence of the skin, exfoliation of the cuticle, congenital small-pox, (George Pearson, W. Lynn, Sir A. Cooper), jaundice, venereal eruptions, mother's marks, various eruptions, diseases of the hair, and even hairy infants. There also may be various alterations in the colour of the skin, red, brown, black, &c.

There may likewise be congenital petechiæ, cyanosis, lentigo, ephelis, chloasma, aurigo, or icteritia (yellow gum), and kirronosis, maladies, which are minutely described in all modern works on diseases of the skin. A vast number of eminent physicians have attested such cases.

Congenital Diseases of the Nails have been likewise observed. These I have described in another work, already cited, *The Physician's Vademecum*, 1837.

Congenital Tumours may appear upon any part of the skin or external surface of the body, at birth, as well as ecchymosis or black marks, contusions or bruises, which are to be treated upon ordinary principles.

Dr. George Pearson, formerly of St. George's Hospital, London, recorded several cases of congenital small-pox, in the *Medical Commentaries*, vol. xxix. p. 213, which are deeply instructive.

Dr. Mead, Dr. W. Hunter, Sir George Baker, Sir William Watson, John Hunter, Baron Dimsdale, Dr. Von Rosenstein, Mr. Cruickshank, Mr. Falconer, Dr. Woodville, Dr. Haygarth, Dr. Ford, Dr. Hossack, and many others, were of this opinion.

Diseases of the Digestive Organs—Amongst these are different ulcerations of the mouth, cheeks, gums, throat, of the œsophagus or gullet, stomach, intestines, liver, pancreas, mesenteric glands, spleen, and genito-urinary organs. Painful dentition and caries of the teeth causing toothache, belong to this category or head. The most graphic account

of congenital and intra-uterine diseases in every part of the body, will be found in the valuable work of the late Dr. Billard, which is now translated into our language. I have also described them minutely in the *Lectures on Diseases of Children*, and in *The Physician's Vademecum*, already so often quoted; as well as all those of the respiratory, circulatory, and other systems. I shall therefore content myself with observing, in this place, that every organ in the body may be more or less defective, inflamed, or diseased; or any organ totally absent in the foetus in utero, and consequently at birth.

M. Billard gives the following table of congenital diseases in favour and against infantile viability, which I consider correct, and of great importance in medico-legal inquiries concerning prolicide, and which I enlarge.

1. *Vices of Conformation, and Diseases necessarily mortal.*—Absence of the skin, with want of the parietes of the splanchnic cavities (eventration), or absence of the bones of the head, chest, or abdomen, as the spine, &c., to any great extent; obliteration, division, or duplicity of the œsophagus; ulcers and gelatiniform ramollissement of this organ before birth; obliteration of the stomach; its gelatiniform ramollissement developed before birth; obliteration, division of the superior parts, or the middle or inferior third of the digestive canal; general ramollissement of the intestinal mucous membrane, developed before birth; dropsy of one or both kidneys; obliteration and cohesion of the rectum to the bladder; malformation of the nasal fossæ, with monopsy; hernia of the abdominal organs into the thorax; inflammation of the pleura, lungs, bronchiæ, developed before birth, or during parturition; inability to dilate the cavity of the thorax, in consequence of the feebleness of the infant; congestion of the lungs and of the heart, at the moment of birth; a single heart, with one auricle and ventricle; division of the heart into two parts, by a complete septum; pericarditis developed during intra-uterine life; acephaly and anencephaly; vices of conformation of the spinal marrow; hydrocephalus, with considerable deformation of the cranium; encephalocele with hydrocephalus; apoplexy, complicated or not with fracture of the cranium, occurring before or during parturition; ramollissement of the brain; hydrorachis, with ulceration of the tumour.

2. *Diseases which are not necessarily mortal, but prevent the development of independent life.*—Ecchymoses, contusions, sanguineous tumours, cynopathy; nævi materni inordinately developed; cutaneous inflammations; adherence of the lips; excessive length of the tongue; extreme shortness of the pharynx; simple œsophagitis; follicular ulcers of the stomach; simple contractions of the intestines; imperforation of the anus; intestinal hæmorrhage; calculous nephritis; peritonitis with or without dropsy; vices of conformation, or depression of the thoracic parietes; communications more or less considerable, either between the auricles or ventricles of the heart; hydrocephalus more or less advanced, without separation of the bones of the cranium; imperforation or absence of the vagina; accumulation of mucus in the bronchiæ.

3. *Diseases which do not oppose viability.*—Simple absence of the skin; cutaneous excrescences; excessive development of the capillary

system; albinism; stationary nævi materni; harelip and cleft palate; transposition of the stomach and abdominal viscera; absence of one kidney; hypospadias, epispadias, and pleurospadias; extroversion of the bladder; umbilical and inguinal hernia; transposition of the heart; contractions of its orifices, anomalies of their valves; persistence of the foetal openings some days after birth; cerebral atrophy; hydrorachis without ulceration of the tumour; fractures, luxations, and divisions of members.

The following conclusions may be drawn concerning viability in relation to the pathology of new-born infants.

1. That every infant which has respired, and is affected with any of the diseases in the first order of the above table, cannot be considered viable.

2. That every infant that has respired, and is affected with any of the diseases in the second order, is viable, but not likely to arrive at maturity.

3. That every infant that has respired, affected with any of the diseases in the third order, is evidently viable.

These conclusions should be most carefully borne in mind in most cases of prolicide or infanticide, many charges of which, as was well observed by Dr. W. Hunter, are easily and unjustly made against the truly unfortunate portion of the female sex, in all countries, who have been seduced, deserted, and ruined, by those whose duty it is to respect and preserve their honour. It is, however, gratifying to the philanthropist to know, that medical evidence, when scientific and correct, often preserves female life in many such cases, from sacrifice and unjust censure.

Diseases of Infants caused by Parturition.—These are, elongation of the head, apoplexy, syncope, contusions, lacerated and contused wounds, luxations, and fractures.

Elongation of the head is caused by narrowness of the pelvic bones of the mother, through which it has to pass, rigidity of the neck of the womb, the size of the head being compressed in its descent.

This disease is not dangerous, and usually disappears without any treatment. Nurses compress the head into the proper shape, and often apply ardent spirit of some kind, which is totally unnecessary, and frequently injurious.

When there is effusion of blood under any part of the scalp, cold lotions may be applied, and it is rarely necessary to make an incision, as proposed by some authors.

Apoplexy is caused by the compression of the pelvic bones on the foetus, or on the umbilical cord, during parturition. The more protracted the labour, and the more difficult the birth of the foetus, the greater is the danger of apoplexy.

Infants born with this disease have all the functions of life suspended except respiration and circulation; the countenance is swollen, black, red, or violet; the lips are tumefied, and separated from each other; the eyelids are vascular or livid, and the eyes appear as if starting from their sockets. Such are also many of the appearances when an infant is destroyed by strangulation.

It is most important to state, that a great number of first-born infants

are deprived of life by apoplexy, in consequence of the rigidity of the soft parts of the mother.

Treatment.—The indications of treatment are, to expedite delivery, to incise the umbilical cord as soon as the infant is born, and to allow the blood to flow, according to the strength of constitution and condition of the little patient. I may here observe that I have frequently known the loss of half an ounce or of an ounce of blood from the divided navel cord to preserve life. It may, however, be necessary, in bad cases, to apply one or two leeches behind the ears, a cold lotion constantly on the head, friction to be made on the face and spine, and all means calculated for resuscitation to be employed. (See also p. 517).

Syncope.—Infants who have lost much blood by rupture of the navel cord, or separation of the placenta, are born pale, the muscles relaxed, the limbs moveable, the respiration very feeble, and almost suspended, the circulation scarcely perceptible, and death apparent.

The *treatment* consists in the use of all remedies capable of reviving the vital powers, such as warm baths, to which some brandy or other spirituous fluid may be added, dry frictions on the spine, face, chest, region of the heart, and extremities, with artificial respiration, electricity, galvanism, and transfusion of blood through the umbilical vein. A tea-spoonful of brandy might be passed into the stomach, by means of a tracheal pipe introduced into the œsophagus. I have often found this highly and suddenly effective in rousing the feeble state of the brain, to which it is communicated by the eighth pair of nerves.

In cases in which the amniotic fluid escaped into the lungs, it has been proposed by MM. Heroldt and Scheele, to hold up the infant by the feet, as formerly and erroneously advised in cases of drowning, and should this means fail, to pass a long tube into the trachea, to attach a syringe to the latter, and pump out the fluid.—(*Hatin, op. cit.*) This practice is evidently theoretical and indefensible. The authors should have described the symptoms or signs by which any one could determine the passage of the amniotic fluid into the lung; for it is well known that in cases of recent drowning there is scarcely any water ever found in the lungs, unless the body has been in the water for several days; and it is for this reason that suspending the body of recently drowned persons by the feet is now condemned by all scientific practitioners.

The other diseases, as contusions, luxations, wounds, and fractures, mentioned under the last section, have been already considered, (see p. 489).

Diseases which appear after Birth.—The *Diseases of the Digestive Organs* are retention of the meconium, or contents of the intestinal canal; enteritis; costiveness; diarrhœa; lientary; acidities of the stomach and bowels; colic, or spasm of the intestines, or gripings, dry and watery; intussuseption or invagination of the intestines; vomiting; cholera infantum; hiccup; jaundice, or yellow gum; worms; prolapsus ani vel recti; descent or falling down of the lower bowel; stomatitis or inflammation, succeeded by various ulcerations of the different tissues which form the cheek, including aphthæ, or “thrush,” or “frog,” and painful dentition, or teething.

Diseases of Mucous Membrane.—These are simple and purulent ophthalmia; conjunctivitis; catarrhal ophthalmia; coryza, or cold in the head; sneezing, or “snuffles;” catarrh, simple and suffocating; genital discharges of both sexes.

Diseases of the Respiratory and Circulatory Organs are common and spasmodic (hooping) coughs; quinsies; croup; diphtheritis; spasmodic, or crowing respiration or croup, technically termed spasmodic asthma of infants, and also laryngismus stridulus; œdema of the glottis; foreign bodies in catarrhs, as already mentioned; bronchitis; broncho-pneumonia; different fevers, continued and eruptive, as small-pox, measles, scarlatina, remittent and intermittent.

Diseases of the Cerebro-spinal or Nervous System, most common after birth and during early infancy, are asphyxia, or suspended animation; convulsions, “nine day fits;” chorea, or St. Vitus’s dance; trismus; tetanus; epilepsy; spasmodic constriction of the larynx, causing crowing respiration; hooping or spasmodic cough; risus sardonicus; agrypnia; wakefulness, or want of sleep; incubus, or nightmare; hanaphobia, or nocturnal fright, “night fright,” or screaming during sleep; nocturnal incontinence of urine; somnolence, or drowsiness; hydrocephalus, or arachnitis; irritation; congestion, or inflammation of the brain, or its membranes; hydrocephaloid disorder, or morbid state, closely resembling hydrocephalus.

Diseases of the Senses of Vision, Hearing, Taste, and Touch frequently occur after birth; blindness from closed pupil, cataract, or amaurosis; inflammations of the eye; ear, earache; otitis, or inflammation, suppuration, and deafness, permanent or temporary; deafness and dumbness; toothache; aphonia, or loss of voice, &c.

Diseases of the Skin.—These are very common and numerous soon after birth and during infancy. The following are the most frequent:—cutaneous efflorescences; erythema; erysipelas; excoriations, or chafings in the folds of the skin, in the neck, under the arms, in the groins, about the anus, abdomen, and thighs, in the folds in the arms and legs, in fat infants; suppuration behind the ears; chilblains; whitlow; boils, burns, and scalds; ulceration; fungus, or hæmorrhage from the navel; yellow, red, and white gum; wild-fire rash; pale green rash; tooth rash; blotches; skin bound; dandriff; milky scall; honeycomb scall; lupin scall; branny scall; ringworm; itch; pediculi, or vermin; herpetic eruptions; shingles; water-pox; chicken-pox; swine-pox; globular-pox, or hives; clustering-pox; vesicular fever; roseola, or rose; rose rash; nettle rash; measles; scarlatina; small-pox; cow-pox; purpura; pemphigus; tetters; pemphigus gangrenous, or “burnt holes,” (Whitley Stokes); boils; bunions; and vaccination.

Diseases of the Cellular Tissue—Subcutaneous Diseases.—The most common diseases of this tissue are wasting, emaciation, termed atrophy and marasmus; atrophia ablactarum, or weaning brash; wasting, or consumption; and these are caused by absorption; milky, and other enlargement of the male or female breast soon after death; unusual hardness of the skin, termed skin-bound; and, lastly, anasarca and œdema, popularly called dropsy of the flesh or skin.

Diseases of the Lymphatic System.—These are enlargement, inflam-

mation, induration, suppuration, abscess, ulceration, or mortification of the glands in the neck, chest, abdomen, (*tabes mesenterica*), and in the groins; scrofula in all its forms; diseases of the different joints.

Diseases of the Locomotive Organs, Muscles, Tendons, Cartilages, and Bones, may be intra-uterine or congenital, and are well attested by M. Billard and others.

Malformations and Congenital Diseases of the Secretory Organs, as the Liver, Spleen, Salivary Glands, and Pancreas, as well as the development of *numerous tumours* in the head, chest, abdomen, and external surface, may be intra-uterine or congenital, as frequently observed on examining the bodies of infants born dead, or who died soon after birth.

Diseases of the Urinary Organs.—There may be malformation of the kidney, bladder, penis, urethra, retention or incontinence of urine, urinary gravel, calculi, or stone, as congenital diseases; but such are of comparatively rare occurrence.

The numerous diseases in the preceding catalogue belong to practice of medicine, and I have described their nature and treatment, in cases of adults, in another work, (*The Physician's Vademecum*, 1837), so that I shall now confine my remarks to comments on the most frequent of these complaints in infancy and childhood. I must here remark, that there is much more caution required in prescribing for infants and young persons, than for those who are full grown, and on this account I have considered it prudent to lay down rules for the administration of therapeutics, or remedial means in early life, in p. 468, &c., which the inexperienced reader should peruse before the succeeding observations.

Retention of the Meconium.—The intestinal canal of the fœtus contains a dark greenish fluid in the last months of pregnancy, which is generally discharged in a short time, as a few hours, after the birth of the infant, and more especially by the first secretion of milk after parturition, which possesses aperient qualities, and is termed colostrum. But it frequently happens that there is no secretion of milk at the time of parturition, or for one or two days afterwards, and the newly born infant's bowels do not act. In such cases there may be griping, plaintive cries, swelling of the abdomen, sometimes convulsions, a yellow appearance of the skin, fever, enteritis, peritonitis, or inflammation of the bowels, and death.

The *causes* of retention of the meconium are spasm of the rectum, or of the sphincter ani, viscosity, or tenaciousness of the retained matter, or extreme debility of the newly born infant.

Treatment.—Half a teaspoonful of castor oil, or half a drachm of manna; once, twice, or thrice will, in general, afford relief.

A favourite remedy in France, and other parts of continental Europe, is the syrup of chicory, chiefly composed of rhubarb, in the proportion of half an ounce, or an ounce, in two ounces of simple syrup, barley-water, or gruel. The dose is a teaspoonful or dessert spoonful, according to the strength of the infant, every hour, until it produces the desired effect. Warm fomentations or cataplasms applied to the abdomen, or a warm bath, will often afford relief.

When there is spasm of the sphincter ani, a small suppository of

soap, to which a drop of laudanum may be added, in violent cases, may be used with advantage.

Constipation—Costiveness of very young infants may be removed by repeated doses of castor oil, manna, syrup of senna, decoction or tincture of aloes, &c. In obstinate cases, a very large dose is required. The late Dr. Hamilton, of Edinburgh, exhibited an ounce of the compound tincture of aloes to a newly born infant. Such doses are, however, very rarely necessary.

Acidities of the Stomach and Bowels—Griping, “windy and watery.”—Flatulency, “wind or gas in the bowels,” colic, and hiccup. The following mixture will, in general, be found efficacious in cases of infants from birth to the twelfth month, and the second quantities from the first to the second year, and so on in the increased proportions as age advances.

℞. Sacchari puri, ʒss—j—ij; olei anisi, ℥. iv—vj—viij, tere simul et adde, aquæ anethi, ʒj—ij—iij; liquor. opii, vel solutionis morphiæ, mur., ℥. j—ij—iij—iv; syrupi simplicis, ʒj; confect. arom. ʒss—3ss. Dosis, ʒj, vel cochleare parvum singulis semihoris, vel horis, et sic, pro ut urgeant symptomata.

English Cholera, or vomiting and purging of infants, will be relieved and cured by the same medicine as prescribed in the last paragraph.

Diarrhœa.—Relaxation of the intestines is rarely observed in early infancy, but often occurs at the period of ablactation, or weaning, or is induced by improper food taken by wet nurses, by dentition, or worms. It will be relieved by the following mixture in most cases during the first, second, or third year:—

℞. Misturæ cretæ, ʒj—ij—iij; tinct. kino, vel catechu, ʒj—ij—iij, tinct. opii, ℥. iv—vj—viij; confect. arom., gr. x—xv—xx; syrupi simplicis, ʒj. Dosis, coch. parv. post singulas sedes liquidas donec fluxus cessaverit, vel somnus supervenerit.

There are three prescriptions in this one, according to the three ages specified, and the dose is a teaspoonful after each motion from the bowels, until the disease ceases, or somnolence or sleepiness supervenes.

During the fourth, fifth, and sixth years, the same medicine may be used as follows:—

℞. Mist. cretæ, ʒij—iv—vj; tinct. kino, vel catechu, ʒij—iv—vj; tinct. opii, ℥. viij—xij—xvj; confect. arom., ʒij—3ss—3jss; syrupi simplicis, ʒj. Dosis, ʒj, vel cochl. parv. post singulas sedes liquidas.

Icterus Neophytorum—Jaundice—Yellow Gum.—This disease appears in a few days after birth. The whole or a part of the skin may become as yellow as an orange.

The causes are deprivation of breast-milk, retention of the meconium or greenish fluid in the intestines, deteriorated quality of the milk, derangement of the digestive organs, and exposure to cold and damp.

The disease usually disappears by the use of mild aperients, (see Constipation or Costiveness above), in a very few days, unless the mother has been jaundiced during the eighth or ninth month of pregnancy, and then the disease will be cured with difficulty. In the latter cases there is, generally, much drowsiness, or itching of the skin, as in cases of adults.

Dysentery of young Infants or Children.—This disease is of very rare occurrence, and will in general be cured during the first and second, the third and fourth, and the fifth and sixth years by the following medicine, which is prescribed according to these ages, and when the mixtures for diarrhœa, already described, have failed:—

℞. Plumbi diacetatis, gr. ss—j—ij; aceti acetici dilute, m. j—ij—iij; aquæ destillatæ, ʒj—ij—iv; sacchari, ʒj—ij. Dosis, ʒj, vel cochl. parvum singulis, secundis, vel tertiis horis.

Prolapsus Recti—Descent of the Rectum.—This disease is caused by relaxation of the intestinal mucous membrane, and efforts made to evacuate the bowels when costive.

In the first case tonic and astringent lotions may be applied, the protruded part smeared with olive oil or simple cerate, and returned into its natural situation, in which it is to be retained by means of a pledget of lint and a T bandage.

In the second case mild aperients and emollient applications, combined with opium or belladonna, may be made to the sphincter ani, so as to cause relaxation of the muscle.

Ophthalmia Neonatorum.—Infants are often seized with very slight inflammation of one or both eyes, which usually disappears in two or three days by ablution, with tepid milk and water. When the inflammation is severe, and does not yield to this plan, and there is a mucopurulent discharge, a leech should be applied to each temple, and an aperient administered. The best lotion for washing the eye is composed of one grain of oxymuriate of mercury and eight ounces of water, and after removing the discharge, the conjunctiva should be touched with a camel-hair pencil, moistened in a solution of four grains of nitras argenti, or six grains of sulphas cupri dissolved in an ounce of distilled water. The ointment of red precipitate of mercury, or oxide of zinc, is to be applied to the eyelids at night to prevent them from adhering to each other. Such is the mode of cure proposed by Dr. Mackenzie of Glasgow. This plan effects a cure in a few days, and is assisted by a blister to the neck in bad cases; but sometimes the disease continues for weeks in despite of all remedies.

When the disease is diminished, and becoming chronic, a lotion of alum and rose-water will remove it. The following formula is very effectual—six grains of alum and two ounces of rose-water. The vinum or liq. opii is an excellent remedy.

When the inflammation is intense, with tumefaction of the lid, and copious purulent discharge from the eye, this is called *purulent ophthalmia*. This form of disease arises from the application of gonorrhœal or leucorrhœal matter to the eyes, during or after parturition, and is often destructive of vision, unless properly managed. The eyelids are enormously enlarged, and in a few hours spasmodically closed: and if separated, a jet of greenish-yellow purulent fluid takes place. The cornea is muddy, and the conjunctiva is highly vascular. The mischief may extend to the globe of the eye, and cause an effusion of pus (hypopion), softening or ulceration of the cornea, escape of the humours and crystalline lens, or the latter may become opaque, and the infant be deprived of vision, especially when both the eyes are affected, or

deprived of life by the excessive pain and marasmus. The treatment recommended by Mr. Guthrie in purulent ophthalmia, is the application of the ung. argent, nitratis, or black ointment. His formula is as follows:

R. Argenti nitratis, gr. x; cerati cetacei, 3j; tere intime et adde gradatim, liquoris plumbi acet. m. xv.

The mode of application requires attention. The eye is to be washed and wiped; the eyelids everted, and the ointment applied with a camel-hair pencil to the conjunctiva. It is said that the greatest improvement takes place next day, and that the disease is cured in a very short time. Dr. Mackenzie has found the former plan succeed, and thinks this remedy unnecessary in most cases. I have been informed by several of Mr. Guthrie's pupils, who attended my lectures, that the nitrate of silver ointment is in general a most efficacious remedy. I have found it so in a few cases; it does not produce so much pain as I expected.

Leucorrhœa.—Purulent discharge from the genitals of female infants is nearly analogous to the disease last described, as arising from the same cause, (Duges), and in the same tissue. When the discharge is white, it disappears spontaneously in a few days; but when greenish or yellow, the inflammation is more intense. According to Sir Astley Cooper, the preputium clitoridis is the seat of the malady; and black wash, (calomel and lime water), with cleanliness, is the best remedy. I have repeatedly seen it on very young infants, and sometimes on two or more in the same family, at the same time. It is interesting in a medico-legal point of view to determine whether it is contagious. It appears in healthy as well as diseased infants and children. According to the French writers, it may be expedient to know that purulent leucorrhœa produces simple gonorrhœa in the male; but it is difficult to suppose a female infant can come in contact with another, and communicate the disease. Dr. Darwall has seen three children, whom he considered had taken the disease from each other. The oldest was only five years of age, the second was three, and the last was an infant at the breast. He, therefore, advises that the affected child should lie alone. (On Diseases of Children, &c. 1830). Much more evidence is required, in my opinion, to confirm the infectious nature of the disease.

Aphthæ, Thrush, Muguet, or White Millet of the French.—This disease consists of small white spots, or vesicles upon the tongue, cheeks, and throat, which may ulcerate and assume a red or black colour. It is said to arise from the difficulty experienced by the infant on taking the breast, from the milk of an old nurse, from derangement of the digestive organs, and, lastly, from syphilis. It may be accompanied with fever or diarrhœa, or ulceration about the anus. According to Mr. Cooke and others, there is erythema in some portion of the gastro-intestinal mucous membrane. Duges asserts that the disease is not observed below the cardiac orifice of the stomach, while others contend it extends from the mouth to the anus. Experience has convinced me that both parties are right. The examples of the disease in the stomach and intestines are rare, (Billard, Lelut, Duges).

Such was the state of the pathology of these different diseases to the year 1832, when the late M. Billard, after having examined the

bodies of three hundred infants at the Foundling Hospital in Paris, not only confirmed the preceding conclusions, which he describes under the term stomatis:—one, erythematous; two, with alteration of secretion, muguet, or millet of the French; three, follicular, aphthous; four, ulcerous; and five, gangrenous. Every one of these forms may extend along the whole intestinal tube, from the mouth to the anus, and were verified by numerous dissections. I have translated this valuable and instructive chapter of M. Billard's production, and published it in the *Physician's Vademecum*, 1837.

With respect to the treatment, a good nurse, plain food, and good air, are of primary importance. The mel boracis, Armenian bole and honey, applied to the mouth, with moderate purgation, constitute the treatment. The hydrargyrum c. creta with rhubarb, is lauded by some; but I am convinced that calomel, rhubarb, and magnesia, with pure sugar, are better remedies. When there is much debility, the syrup of quinine is of the utmost value. The chloride of lime in solution, sweetened, is highly beneficial. In general the disease is mild, and may arise without any evident cause. In some bad cases all remedies may fail; but even in some few of these, change of air and proper diet may effect a cure. Dr. Darwall thinks the diet of the nurse should be attended to. Others advise leeches, and afterwards stimulating liniments to the surface of the abdomen. The diet of the infant should consist of the vegetable or animal jellies.

Gastritis, Enteritis, Peritonitis.—These inflammations may exist with or without aphthæ. There will be redness of the tongue, fever, vomiting, and diarrhœa, and sometimes tympanites. These diseases are occasionally found to exist in some degree in the infantile remittent fever. The autopsy will show erythema, inflammation, or ulceration in some part of the intestinal tube. It is, therefore, manifest, that leeching and counter-irritation on the abdominal surface are requisite, with warm-bath, barley-water, weak broths, beef-tea, &c. When diarrhœa is urgent, the chalk mixture, with proper doses of the sedative preparations of opium, are of infinite service; and when great prostration of the vital powers appears, we must support the strength with arrow-root, and a few drops of brandy, or aromatic spirit of ammonia, beef-tea, &c. When the disease becomes chronic, a nutritious and mild diet, with alterative doses of mercury, rhubarb, and antimony, are of essential service.

Bronchitis, Pleuro-pneumonia.—The application of cold to the mucous membrane of the lungs and air-passages, induces catarrh, which is sometimes epidemic; this is called "common cold." The first symptom is frequent sneezing, followed by a discharge of watery mucus from the nose. The infant sleeps with its mouth open, and cannot suck from the obstructed state of the nostrils. The respiration is sonorous, and there is more or less wheezing during sleep, and at all times, if we apply the ear or the stethoscope to the chest. The difficulty of breathing is increased in proportion as the inflammation extends into the mucous membrane of the lungs. A young infant, or one of a few months old, cannot expectorate. It coughs, and gets up the mucus into the pharynx, and then swallows it. The mucus accumulates in the stomach, and is discharged by vomiting or by diarrhœa. Hence the practice of exhi-

biting emetics and aperients. The child dies of exhaustion, from inability to take the breast. A fatal termination may occur in three days; the respiration becomes impeded; signs of cerebral congestion appear. There is a lividity of the countenance, which led Underwood to style the disease "the malignant snuffles." The danger of this complaint arises from the infant not taking sufficient food, the blood not being properly vivified in the lungs, or coma with effusion in the brain, and convulsions taking place.

In the treatment of this disease, we must commence by opening the bowels with castor-oil, magnesia, &c.; then applying two or three leeches to the chest, under the clavicles, which produce the best effects; and should the case be urgent, a blister is necessary. The following mixture is also of great use:—

℞. Syrupi simplicis, 3x—xij; oxymellis scillæ, 3ss—j; mucilag. acaciæ, 3ij; acid. hydrocyanic., m j; m sit mistura. Dosis coch. min. 2^{da}. vel 3^a. q. q. hora.

A few drops of vin. antim. may be substituted for the hydrocyanic acid, in mild cases.

Pneumonia, and Pleuro-pneumonia, are analogous in their symptoms and treatment with catarrh. Pneumonia attacks new-born infants more frequently than children; is generally considered "a cold," is neglected, and hence it is so often fatal. Auscultation affords the only certain diagnosis, the *crepitating râle*, whereas the *mucous râle* is characteristic of catarrh. The respiration is more difficult, the cough less troublesome, the fever more intense, and the face more livid, in the disease under notice. The infant cries when it coughs, the countenance becomes livid, the nostrils dilated during inspiration, the head becomes affected, and death may take place from the third to the seventh day. In general the posterior part of one lung is affected. On dissection the lung will be found hepatised, and the pleura covered by a false membrane.

The *treatment* consists of leeches to the chest, purgatives, diaphoretics, blisters, and mustard pediluvia. Infants and children do not bear large doses of tartarized antimony, in consequence of gastro-intestinal irritation, which is generally present; and also from the frequency of softening of the coats of the stomach. Warm bathing is sometimes used to equalize the circulation.—(See *Blisters, Mustard Cataplasms, &c.*, p. 469).

Extra-uterine Asphyxia.—Infants have been destroyed by strangulation, suffocation, and submersion, or drowning. In all these cases we should free the air-passages, expose the infant to fresh air, employ baths, friction, errhines, sinapisms, ammoniacal frictions, vinegar, clysters, &c. I have fully described the morbid appearances in my *Manual of Medical Jurisprudence*, 1836.

Cynanche Trachealis-Croup.—This is the tracheitis of foreign writers, and comes on like catarrh; but is soon followed by a crowing or croupy respiration, something similar to the crowing of a young cock. The respiration is difficult, the face speedily becomes livid, cerebral congestion appears and destroys life, or death happens from suffocation. On dissection, we find inflammation of the mucous membrane of the trachea, and sometimes of the bronchi, or a false membrane is formed

of considerable thickness, so as to fill up the trachea and upper portion of the bronchial tube. The disease comes on suddenly, and often proves fatal in twenty-four hours.

The indications of *treatment* are, to arrest inflammation, and thus prevent the formation of the false membrane. To effect this purpose, we should apply three or four leeches along the trachea, open a vein in the back of the hand, or on the instep, and immerse the limb in a basin of warm water, or open the jugular vein. We next exhibit an emetic of antimonial wine, and put the patient in a warm bath, and after his removal apply a blister in the course of the trachea. Depletion is only useful in the first stage of the disease. When this has passed, our chief dependence is to be placed on large doses of calomel, as recommended by Dr. Hamilton. He states that forty cases were cured by it, and that it is effectual if given before lividity of the face appears. It should be continued in the dose of a grain and a half every hour to an infant six months old, and four-grain doses every hour may be given to one of two years old, until vomiting, purging, or green dejections are produced. It was given to the amount of one hundred and eighty grains in one case with success. Its mode of influence on croup is not determined; some say it stops the effusion of lymph, as in iritis; and others, that it promotes absorption. Perhaps its excitation of the liver, and other digestive organs, diverts the circulation from the trachea. I have known it succeed when every other remedy had failed. It sometimes causes salivation. I would not, however, trust to it solely, but employ the other remedies at the same time. I know a practitioner who never uses any remedy in croup but repeated doses of calomel and antimonial powder, and seldom loses a patient. Mackenzie recommends the application of a solution of nitrate of silver to the internal fauces, as he says fibrine is first deposited there, and then descends into the trachea. This is called diphtheritis. Bretonneau advises a solution of alum, which is much safer. When suffocation is threatened, bronchotomy is to be performed. The last-named writer advises us to pass a piece of nitrate of silver through the opening, and apply it to the false membrane in those cases in which the latter cannot be extracted. Vomiting may cause the expulsion of the membrane, and hence the exhibition of antimonial wine by many practitioners.

Pertussis, Hooping Cough, Cerebro-bronchitis.—This disease is so well known, that I need not give its symptoms. It is important to mention, that it may induce cerebral or pulmonary congestion, and these dangerous states require active treatment. In general the patient suffers little; the disease continues for weeks or months, in despite of all remedies, and then disappears. Hooping-cough arises from spasm, or is purely nervous, according to the majority of writers. Others maintain that some tissue in the chest is diseased. The first opinion is worthy of confidence, the other is mistaking the effect for the cause.

The *treatment* consists in regulating the bowels, applying sedative or stimulating embrocations to the face, neck, chest, and spine, exhibiting antispasmodic cough mixtures, and leeching the chest and head when congestion or inflammation appears in either part. As vomiting very often occurs, and as the expectorated mucus is swallowed, repeated

emetics are advised by some writers. A combination of camphorated oil, soap liniment, oils of turpentine and amber, rubbed on the spinal vertebræ, produces good effects. In severe cases, the antimonial ointment to the chest will be beneficial. The application of the pitch plaster with a few grains of tartarised antimony, between the scapulæ, often affords relief. The antispasmodics and narcotics are very strongly recommended by some practitioners. Great care must be observed in the use of them. I have known a practitioner who boasted of a specific for pertussis, which was a combination of camphor and opium in powder. I have found hydrocyanic acid a valuable remedy, and combine it with other sedatives in the following manner, carefully watching the effects:

℞. Syrupi simplicis, ʒijss; oxymellis scillæ, ʒss; mucilaginis acaciæ, ʒiv; extract. conii, āā gr. j—ij; extract. hyosciami, āā gr. j—ij; tinc. camph. c. ʒj—ij; acid. hydrocyan., mj—ij; m fiat mistura, de quâ sumatur coch. min. phialâ prius agitatâ, bis vel ter in die, nisi supervenerit somnolentia, vel nausea.

The dose must be regulated according to the age of the infant. The bowels should be well regulated. When cerebral symptoms appear, leeches are to be applied to the temples, an evaporating lotion to the head, and mustard pediluvia; in a word, the same practice as in hydrocephalus. This last complication is often present in consequence of dentition, and unless well managed, proves fatal. The child dies in convulsions; and we find congestion, or effusion, in the brain. This leads me to describe the lesions of the *Cerebral Functions*.

Apoplexy.—Infants may not only be affected with apoplexy at birth, vide page 507, but also for several days afterwards. There is a violet colour of the face and whole body, injection of the conjunctival vessels, dilated pupils, stertorous respiration; asphyxia more or less complete, and flaccidity of the extremities, with immobility, insensibility, and suspension of the pulse. At other times there are convulsions, or more properly, eclampsy.

The chief object *in the treatment* of this disease is to dissipate cerebral congestion, and this is best effected by allowing the navel-string to bleed to the amount of an ounce or two, according to the size of the infant. The warm bath is useful; but cold should be applied to the head during the immersion of the body. A leech to each temple, and a blister to the neck, are powerful remedies.

If asphyxia supervenes, we should resort to artificial insufflation, stimulating frictions on the spine and chest, soles of the feet, and palms of the hands; and according to Dr. Hamilton, on the face. He advised the application of brandy or hartshorn to the face and chest, as the best means of resuscitating still-born infants, long before the discovery of Sir C. Bell, or M. Magendie. I have found the practice successful in numerous cases.

Convulsions, Eclampsy.—This disease may arise from a variety of causes; but in new-born infants it generally accompanies the malady just described. The treatment in both is the same. It sometimes arises from dentition, worms, or the non-appearance of the eruption in measles, small-pox, or scarlatina. During the attack, all the muscles are thrown into involuntary action, there is foaming at the mouth, pro-

trusion of the tongue, the countenance distorted, squinting, lividity of the face, and laborious respiration. The fits may continue a few minutes, and recur frequently.

The general practice in *treating* this disease, is to immerse the infant in a warm bath, and to apply cold to the head at the same time. The water must not be too hot, or it acts as a stimulant. Temporary relief is generally obtained by this remedy; but we should cover the head with a piece of muslin, and keep this constantly wetted with cold water, or some of the evaporating lotions. This is to be accomplished by dropping the water from a sponge, or in bad cases, allowing the water to fall on the bare scalp, from twelve to twenty inches in height. The application of ice, in folds of muslin, or a bladder of cold water, has produced the best effects. The bowels should be opened by some medicine suitable to the age of the patient.

Opiates must be carefully avoided. If there are well marked signs of cerebral congestion, we must treat the case as one of apoplexy, in the manner described in the last article. If dentition is present, scarification of the gums will often afford immediate relief. It is to be recollected that convulsions will arise from exhaustion, as well as from plethora, or congestion, and then the treatment must be stimulant. We can easily diagnose by learning the history of the case; and whether any cause of exhaustion has existed. Bleeding or purging would destroy the patient. Aromatic spirit of ammonia, or a few drops of brandy in arrow-root or milk, with beef-tea, chicken-broth, &c., are the best remedies.

Tetanus, trismus nascentium.—This is a rare disease in temperate climates, and only seen in warm countries. Warm baths, with opiate liniments, are the best remedies. The bowels, of course, should be duly regulated.

Lesions of the Senses.—Infants are born with cataract, strabismus, and deafness; and here we can do little for some time. I once operated on a boy seven years old who had congenital cataracts, and succeeded in affording him vision. The use of goggles, the apertures placed so as to bring the eye in the proper position, are said to relieve, and often remove, strabismus.

Lesions of Digestion. Difficult Dentition.—Dentition usually commences between the fifth and eighth months, but some delicate or rickety infants have no teeth sooner than a year and a half, or two years of age. The infant while teething is peevish and fretful, has its fingers continually in its mouth, starts from its sleep, cries, moans, or screams suddenly, and again dozes. The pain arises from the pressure of the teeth on the gums, and the irritation extends to the brain and digestive organs, inducing convulsions, deranged appetite, or diarrhoea. These effects can be easily explained by calling to mind the connexion between the cerebral and spinal nerves. The gums become swollen and inflamed; fever, thirst, diarrhoea, erythema of the skin, ulceration behind the ears, cerebral congestion, convulsions, and coma supervene, and these may terminate in hydrocephalus. The warm bath is the panacea in all infantile diseases with many practitioners, and is generally recommended in difficult dentition.

The best and most efficacious remedy is lancing or scarifying the gums. It often happens, after this operation, that the convulsed infant falls into a tranquil sleep, and awakes lively, and in perfect health. Lancing the gums is by no means a painful operation; I have repeatedly performed it without the infant making the slightest moan. We should always use a clean gum-lancet, and take care to have it well sharpened, as in cutting down on the tooth, and fairly dividing the gum, the edge will be blunted. Wherever the gum is partially swollen or inflamed, it must be divided freely by a *simple* incision; and I find this generally successful without the crucial division, advised by some writers. In nine cases out of ten immediate relief is afforded. The practitioner who neglects this operation, does not act honestly towards those parents who employ him. Some incise the gum from one angle of the jaw to the other, the uninflamed as well as the swollen parts, but such practitioner overlooks the successive appearance of the teeth, and performs a useless and painful operation whenever the gum is not swollen. The bowels should be properly regulated; and diarrhoea, when excessive, arrested by chalk mixture, catechu, and sedative liquor of opium. The diet should be mild and nutritious; and as the appetite is sometimes voracious, it must not be gratified to satiety.

Should cerebral symptoms be urgent, leeches, warm baths, and cold to the head must be employed. Blistering is generally injurious, as increasing the constitutional irritation. It is bad practice to endeavour to heal ulcers behind the ears. If the bowels are properly managed, these will soon disappear without any local treatment, except the application of fine flour.

Laryngismus Stridulus—Spasmodic Asthma of Infants—occasional Croupal Crowing, or Respiration of young Infants.—This disorder closely resembles in its phenomena inflammatory croup; but all eminent authors agree in opinion, that the one is a nervous affection, and the other inflammatory. The late Dr. H. Ley maintained that the cause of croupal inspiration is a diseased condition of the bronchial and cervical glands, which irritates the eighth pair and recurrent nerves. It is very remarkable that this author did not recommend the iodide of potass or iron in this disease, but confined his remedies to aperients, tonics, and narcotics. I have had the most striking cases in infants from one to three years of age, the fits being extremely violent, were completely relieved by warm baths, with cold to the head at the same time; leeching the larynx, rubbing the base of the skull and spine with ammoniated liniment, all used freely during the paroxysm. Camphorated oil with opium may be rubbed over the face, cheeks, and forehead, two or three times a-day, unless there is enlargement of the head, or determination of blood to this part.

During the paroxysm, the head is often forcibly drawn backwards, the lips, cheeks, and eyelids, are very much convulsed, the respiration is laborious, the face red or purplish, and the veins of the neck very turgid. In such cases the infant is usually immersed in a warm bath, and a napkin dipped in cold water applied to the head, while in that situation.

Some authors even recommend the local and general abstraction of

blood, as in cases of inflammatory croup, (see p. 516), but such treatment is rarely if ever necessary.

The disorder may continue for several weeks or months, during which it will be in general considerably diminished by the following remedies:—

℞. Syrupi simplicis, ʒj—ij; potassæ iodidi, gr. j—ij; acidi hydrocyan. med., m. j. Dosis cochlear. parv. ter in die.

℞. Hydrarg. c creta, gr. vj—viij; pulv. rhei, ʒj—jss; pulv. aromat., gr. x; sacchari puri, ʒss. In chartulas, vj—viij divide, quarum sumat unam, m. n.

In obstinate cases, the chloride formerly called calomel, may be substituted for the former preparation of mercury, more especially if the motions from the bowels be of a brown, black, or white colour. The general health should be improved by every possible means, and change of air very much contributes to the cure.

Epistaxis—Bleeding from the Nose.—This disease is very common to infants and children, but seldom requires any other remedy than the application of cold water and vinegar, or some other cold lotion, to the nose, with rest, and proper attention to the bowels.

Hæmoptysis, or Spitting of Blood.—Hæmatemesis, Vomiting of Blood, rarely attack very young infants, but often prove fatal to children above the seventh year. These diseases are to be treated on ordinary principles, great care being taken not to urge the powerful remedies required to too great an extent. (See Dysentery, p. 512).

Risus Sardonicus.—This term has been applied by the older authors to the smiling of young infants during sleep, accompanied by more or less involuntary motion of the mouth. It is generally ascribed by nurses to the existence of gas or air in the bowels. It is a symptom of no consequence, and is generally relieved by the same remedies as in acidities of the stomach, &c. (see p. 511).

Agrypnia, want of Sleep—Panophobia, Night Fright—Screaming during Sleep, may all be relieved by the medicines prescribed in p. 511, the quantity of the sedative being increased by the educated medical practitioner alone, according to the obstinacy of the disorder.

Incontinence of Urine.—This disorder is frequently observed in infants and children of nervous delicate habits; it is purely a nervous and involuntary affection, and is greatly aggravated by the unjustifiable corporal punishment of the unfortunate little sufferers.

The best mode of *treatment* consists in improving the general health, in diminishing the quantity of fluid before bed-time, in applying a proper sized opiate or belladonna plaister over the sacrum, and in exhibiting an appropriate dose of some direct sedative, such as the solution of the muriate of morphia, or the liquor opii sedativus, at bed-time every night, or every second, third, or fourth night. Sponging the genital organs night and morning with salt, or vinegar and water, and the use of cold bathing, very mainly contribute to the cure of this disorder.

Every experienced medical practitioner must have observed the great cruelties inflicted on children and young persons, without any beneficial effect. I have succeeded in curing a vast number of cases by the above

effect, and even some who had arrived at the sixteenth or eighteenth year of age.

It will be scarcely credited, although my information is most authentic, that the following cases could have possibly occurred in the British army, so recently as within the last twenty years:—A soldier in one of our bravest regiments was afflicted with some disease of the urinary organs, which caused him to wet his bed every night. This was ascribed to laziness and carelessness, and he was compelled, by way of punishment, to carry his bed on his back, and walk for the space of two or three hours daily, for three successive days, along the parade. This system was continued for ten months, when the triangle was resorted to, and my informant positively states, that he was an eye-witness to this, and, moreover, to the infliction of two hundred and fifty lashes, on the man, for having a disease which, in all human probability, was more suited for the regimental hospital than for the horrors of the triangle. This plan having failed, as every well informed medical practitioner would have expected, the reader will be astonished to learn, that after a lapse of five months he was again subjected to the same number of lashes; the charge made against him being the destruction of the bedding of the regiment; at length, through the humanity and good sense of my informant's father, who reasoned with his brother officers on the injury done to the public service, and more particularly to the regiment to which the degraded individual belonged, and was a well conducted man, that it was much better to dismiss him from the service; and thus his discharge was obtained.

I might mention many cases of young women, from the age of sixteen to twenty, who suffered from this disease, who were cruelly punished, pumped on daily, and some compelled by brutal parents to walk in their night dress with their bed on their back, to bathe in the sea at the other end of the city. I am happy to state that these barbarities are much diminished, except amongst the vulgar and ignorant portion of society. This disorder is now properly consigned to the care of the medical faculty, and is generally curable.

Arthritis.—M. Ricord, and many other modern pathologists, have given a most minute account of this disease, as occurring in all the joints of the foetus in utero, as well as in newly born infants. They have observed intense inflammation and suppuration in the different articulations. It therefore follows, that infants of two or three years of age, who are exposed to cold, and to injuries of certain joints from walking or running too fast, or from local injuries, may have these important parts inflamed. Thus we frequently observe infants, who are sent out apparently well with nurses in the morning, return home in good health, but during the following night scream loudly in their sleep, they cannot be pacified, and a medical practitioner is sent for. He carefully examines every part of the surface of the body, and particularly the joints, and generally finds one or more of these, pained on motion, and in an incipient state of inflammation. In such cases he applies leeches, fomentations, warm baths, aperients, diaphoretics, and other appropriate remedies, and subdues all mischief. But it unfor-

tunately happens, that the medical practitioner is seldom called in time, or before the inflammation is developed, and a most painful and tedious disease established.

It would far exceed the limits within which I am circumscribed in this work, to enter upon the pathology and treatment of diseases of the joints, which would require a large volume to be devoted to their consideration. I must therefore refer the reader to the standard works on surgery, for precise information on the management of this class of infirmities; and shall merely offer a few practical observations.

Disease of the Hip-joint.—This was long considered a most tedious and formidable scrofulous disease, which confined the sufferer to bed or to a couch for weeks, months, or years, during which, a succession of leeches, blisters, moxas, and even the actual cautery was in general unsuccessfully applied. The general health became greatly injured, and the affected limb shortened.

The modern *treatment* consists in rest, leeching, warm fomentations, iodated applications, with the internal use of the iodate of potass and sarsaparilla. It was long considered that the internal use of mercury was highly injurious in this disease; but Dr. O'Beirne, of Dublin, gave the histories of several cases of ulceration of the cartilages of the wrist, knee, ankle, and hip-joints, all which cases were successfully treated with mercury.—(See a paper read before the Surgical Society of Ireland, March, 1834, and published in the Dublin Medical Journal, No. XIV., Vol. 5, May 18, 1834.)

Another great improvement has been made in the treatment of enlargement of the knee and ankle-joints, commonly called *white swelling*, both in cases of children and adults. The inexperienced practitioner will be surprised on observing the great reduction of these enlargements, by the internal and local use of the iodated preparations. During the last few years, cases have fallen under my own observation, both in dispensary and private practice, which were declared incurable by the highest medical authorities, and that there was no remedy except amputation, which would not be consented to. The persevering use of the iodated preparations caused absorption of the increased osseous growth, reduced the enlarged joint to nearly its natural size, and secured the patient a limb, which was but slightly deformed. Any one who visits the infirmary for scrofula at Margate, will be much gratified to observe the great benefit produced, even in the worst forms of scrofula, by warm iodated fomentations. Indeed, the very worst forms of the disease are cured at this valuable institution.

Scrofulous enlargement of the Glands of the Neck—One or more of the lymphatic glands of the neck may become painful and inflamed, though the skin remains of its natural colour. The common practice in such cases is to apply hartshorn and oil upon flannel to the affected part, and to open the patient's bowels. Others advise leeching, warm fomentations, and poultices; a plan which usually induces suppuration. Should this happen, although the skin may remain white, a small incision should be made, with a bistoury or lancet, in one of the creases of the skin, with a view of preventing an unsightly cicatrix or scar, more

especially in the cases of female children. The abscess should not, on any account, be allowed to burst spontaneously, as in such case a mark will be inevitable.

Suppuration of the glands of the neck is of common occurrence in delicate children; yet we daily see cases, in which the glands are chronically enlarged, and remain stationary for weeks or months. I have lately had a patient under my care, at one of the dispensaries with which I am connected, who had a chain of enlarged glands, extending from ear to ear, and down to each collar-bone, varying in size, from that of a garden pea to that of a walnut, and these were twenty-two in number. They all yielded in a few months to the internal and external use of the iodated preparations.

Tabes Mesenterica.—In this disease the abdomen is very much enlarged, in consequence of the obstructed state and increased size of the mesenteric glands. It is supposed that the use of improper food by children irritates the mouths of the lacteals, or chyloferous tubes, which pass through these glands, and that this irritation extends from the mouths of the tubes to the glands themselves, causing their enlargement and the obstruction of their tubes, and thus preventing the passage of the chyle, or nutritious part of the food, through these glands and tubes to the heart, as in a state of health. The morbid result is, that the natural supply of nutriment being cut off, every part of the body becomes emaciated by absorption, more especially the upper and lower limbs. Nature, as if to overcome the disease, increases the appetite to an extraordinary degree, the child is absolutely voracious, takes two or three times its ordinary quantity of food, and still continues to waste. I have been repeatedly informed, at the dispensaries, that mothers had lost two, three, four, five, six, and even seven children from this disease in succession. In the last case the eighth child was saved and restored to perfect health, by the following plan of treatment:—

It was ordered the syrup of iodide of potass, and the alterative powders recommended in page 520, in addition to which, a drachm of an ointment, composed of potass. iodidi, ʒj; adipis, ʒj; tinc. opii, ʒj; was rubbed over the abdomen night and morning, and the part covered with a roller of new flannel. Every hygienic and remedial means for the restoration of the general health was adopted, as in cases of scrofula and rickets; such as the use of the animal and vegetable jellies, gravy of roast meat, mixed with bread-crumbs or arrow-root, eggs, coffee, milk, &c. &c. Mr. Houston, surgeon to the Western Eye Dispensary, Mr. Lowe, Mr. Earles, and other industrious pupils of mine, had repeatedly seen this child while under treatment in 1839, and also after its recovery in 1840.

Rachitis—Rachitism—Rickets.—This disease, which is a species of scrofula, consists in enlargement of the wrist, ankle, knee, elbow, and joints of the fingers and toes. There is also more or less defect or deformity of the spinal column.

The *treatment* is the same as in *tabes mesenterica*, just mentioned, with which the disease under notice is very frequently combined. It is important to observe, that in some cases of rickets the tibia, or shin bone, becomes bowed outwards, or bent laterally, the knees press against

each other, forming what is commonly called knock-kneed or in-kneed. We also observe in some cases that the lower extremities become curved outward, from the hip-joints to the ankles, forming bow-legs. In some children afflicted with this disease, the sternum, or breast-bone, becomes depressed, so that the respiration of the little patient is rendered laborious; in others, the sides of the chest become pressed inwards, towards each other, and the breast-bone pressed forward, forming what is called "pigeon-breast or chicken-breast." The respiration is now exceedingly oppressed, the child starts suddenly from its sleep, and cries without any apparent cause, the appetite is bad, and the patient mostly wastes in strength and flesh. It is very important to know, that many children deformed in the above manner, may in the course of time, and where no remedies have been employed, recover their perfect symmetry.

Treatment.—The treatment consist in improving the general health, by daily alterative doses of mercury, iodated preparations, the animal and vegetable jellies, exercise in the open air, residence on the sea shore, warm, or cold sea bathing, &c. &c.

In many deformities of the limbs, great benefit will be experienced by well adapted mechanical apparatus, such as steel supporters attached to the sides of the boots, and also around the waist, and both above and below the knee-joints, with belts applied so as to counteract the curvature of the limb. In cases where the spinal column is affected, a well adapted corset, or stays, may be used with great benefit; but should lateral inclination of the vertebræ exist, a steel supporter should be placed on the opposite side, firmly secured to the stays, and formed like a crutch under the arm, in order to support the side, and thus counteract the curvature. In other cases, where the sternum is depressed, forming hollow chest, or elevated, and forming pigeon-breast or chicken-breast, as described above, exercise suited to the strength of the patient, such as the Indian exercise, recommended in Walker's Philosophy of Health, which consists of wooden clubs, varying in weight from three to ten pounds, which the patient, standing in an erect posture, takes in each hand, and by forming circles with them in various directions, for half an hour at a time, and repeated as often as may be in accordance with the patient's strength, by this means the muscles of the front and sides of the chest become gradually strengthened, and overcome the deformity; but where the patient is too young to practise this exercise, elastic pressure on the chest may be resorted to with great benefit.

Having concluded my account of the diseases of infants and children, and given a variety of pathological facts, which are not to be found in late works on the subject, as well as given a complete view of the nature and treatment of all their diseases, in a technical yet popular form, I shall now conclude my labours by inserting some important information. In page 467 I alluded to the great mortality of infants and children, and it appears that my conclusions were correct. The following extract from the Second Annual Report of the Registrar General of Births, Deaths, and Marriages in England, addressed to the Marquis of Normanby, the Secretary of State for the Home Department, ending June 30, 1839, in order that the same be laid before Parliament, proves the great mortality of children in large towns, &c. &c.

“ I have appended to the abstracts of deaths a table similar to that appended to the abstracts of the preceding year, wherein each is reduced to a common denomination; and the proportion of deaths, at different ages, out of 1000 registered deaths, is shown for each division, and for the whole kingdom. It is thus rendered easy to compare, both different portions of the kingdom, and the results of different years.

“ I will first notice the most remarkable diversities exhibited by the abstracts of the second year of registration, with respect to different portions of the kingdom.

“ The most marked and serious difference is that which is observable between the mortality of rural districts and of large towns, as exemplified in the proportion of the deaths of children, and of persons dying at advanced ages. The mortality of children appears to have been greatest in towns; and among those towns respecting which I can exhibit separate returns, the greatest at Manchester, where it appears that, out of every 1000 deaths of males, 496 were of children under 3 years of age. The mean deaths of children under 3 years, in Manchester and Salford and suburbs, were 475 out of 1000 deaths. In Leeds and its suburbs, the proportion was 447; in Birmingham, 440; in Liverpool and West Derby, 437; while in Dorsetshire and Wiltshire it was 281; in Devonshire, 296; in the North Riding of Yorkshire, with Durham, (except the mining parts), and the northern part of the West Riding, 282; and in the northern part of Lancashire, Westmorland, Cumberland, and Northumberland, (except the mining portion of the latter), not more than 253. In the whole of England and Wales, the mean mortality under 3 years was 343 out of 1000 deaths at all ages; and it is to be remarked that notwithstanding the comparative unhealthiness of towns, the proportion in the metropolis is still less—namely, 338.

“ Equally remarkable are the contrasts exhibited by the towns and rural districts, with respect to the proportion of persons who appear to have died in old age. The proportion out of every 1000 deaths, which have been at the age of 70 and upwards, has been, in Manchester, only 53; in Liverpool, 60; in Leeds, 68; in Birmingham, 78; in the metropolis, 99; while in the North Riding of Yorkshire and the agricultural parts of Durham, it is 202; in Devonshire, 208; and in the north of Lancashire, Westmorland, Cumberland, and Northumberland, not less than 210. In the whole of England and Wales, the proportion, out of 1000 deaths occurring at 70 and upwards, was 140.

“ Great also are the differences exhibited by the mining districts and the agricultural districts which surround them, with respect to mortality both in childhood and in advanced age.

“ In the mining parts of Staffordshire and Shropshire, the mean deaths in 1000 at all ages under 3 years were 462; at 70 and upwards, only 90. In the rest of Staffordshire, Shropshire, and Cheshire, the proportion under 3 years was 332; at 70 and upwards, 141. In the mining parts of Northumberland and Durham, the proportion of deaths under 3 years of age was 349; of deaths at 70 and upwards, 150; while in the surrounding agricultural districts, comprised in divisions

22 and 24, the proportions of deaths under 3 were only 282 and 252; and of deaths at 70 and upwards, 202 and 210.

“ It is necessary, however, that I should repeat the caution which I gave in my First Report, that the comparative table cannot be used without risk of error, unless regard is paid to the facts exhibited in the enumeration of ages of persons living in 1821, made under the authority of the Population Act; an enumeration, some of the most important features of which I pointed out in my First Report, and which, on account of its value as a means of correcting erroneous inferences, I have again caused to be printed, and inserted after the comparative table of deaths.

“ It must also be borne in mind that the proportions of the deaths of children, though showing a high mortality in some places as compared with that of others, must not be regarded as true criterions of the comparative mortality, unless the proportions of living children to living adults were in those different places the same. Neither must it be supposed that the proportion of children dying out of 1000 deaths at all ages, whether given for the whole or for any part of England and Wales, will afford the means of expressing correctly the proportion of such deaths to the living population. This would not be the case unless the population were stationary, the deaths being equal to the births; but in England and Wales the number of births greatly exceeds that of the deaths, as will appear from the following abstracts. Even though the registration of births is still deficient, (and there is reason to believe that the number registered in every one of the 25 divisions falls short of the actual number), yet, even with this admitted probable deficiency, the number of births, if applied as an element of calculation, as in the subjoined table, will show a mortality much less than it appears in the comparative table of deaths. Neither of these, however, can be accepted as correct; and even the proportion of deaths under 1 year to 1000 registered births, as exhibited in the first column, is a little higher than the truth.”

There is a vast fund of most valuable information in the Report just quoted, which should, in my opinion, be carefully studied, and its principles adopted, not only by every British medical practitioner, but also by those in all civilized countries, more especially wherever medical and vital statistics are in their infancy.

The preceding account of infantile diseases does not extend to those of childhood, as these are now treated upon established principles, well known to all modern students and practitioners.

CALENDAR FOR CALCULATING THE DETECTION, PROGRESS, AND DURATION OF PREGNANCY.

(From the German Marriage Almanack.)

[In Chapter viii., page 150 to page 165, I have placed before the reader the vast number of questions affecting the honour, character, and peace of families, public morals, and the administration of justice, as in cases of reprieve, criminal abortion, infanticide, legitimacy, and recent delivery.

It is, perhaps, utterly impossible for women in the conjugal state, or those who indulge much in sexual intercourse, to determine the exact period of conception, unless in those cases in which temporary separation has occurred, and the intimacy has been renewed at a certain date on the reunion of the parties. Professor Dewees, of Philadelphia, mentions a remarkable case in which a gentleman who was embarrassed in his affairs, and absent from home for some weeks, clandestinely returned on a certain night, the result of which was, that his wife was delivered of a healthy infant at the expiration of nine calendar months from the period of his visit. In proof of the former statement it may be observed that few married women can conclude whether they are pregnant or not after one, two, or three menstrual obstructions; and every practical obstetrician is aware, that many women are four, five, six, or even more weeks wrong in their reckoning, and that these periods elapse after the expected parturition.

Natural pregnancy generally continues to about the tenth lunar or ninth calendar month and a week, that is, about two hundred and eighty days; but many are delivered at the two hundred and seventieth, or seventy-fifth day.

It has been proved both in the British dominions and in France, that the exact limit of pregnancy is not as yet determined in either kingdom, and that infants born at three hundred and three hundred and ten days were acknowledged to be legitimate. Some women calculate from the date of the last monthly health, and expect parturition to occur at the end of the tenth lunar month from that period; others reckon from the middle of the month to the next expected appearance; while more count from the second menstrual obstruction, so that here is nearly a difference of a month in computation. Some women count from the period of quickening, which usually occurs at the middle of pregnancy, or about the twentieth week; but in some cases the motion called quickening occurs from the eighth to the twentieth week, while in others it is not felt at all during the whole period of pregnancy, even by women who had experienced it on four or five different occasions which occurred previously.

The following Tables are calculated with as much accuracy as possible, but I do not pretend to attest their positive correctness; though on careful examination, I found them very nearly so. Thus, when the state of the pregnancy is known, the reckoning commences from that or the next day, or when unknown, from the last monthly appearance. Suppose the date of the conception or last menstrual appearance to be on the 14th of May, the middle period of pregnancy will be on the 30th of September, and the termination about the 18th of February. But if neither the period of conception nor the last menstrual period be recollected, the time of quickening, when the movements of the infant are first perceived; but, as I have already stated, this is not invariably perceptible to the woman, though when it occurs, it is generally about the twentieth week, which is the middle period of pregnancy. Suppose the day of quickening to be the 14th of March, the table must be looked for in which March is in the middle column, and it will be seen that the period at which pregnancy occurred was the 26th of October, or thereabouts, and the period of parturition will be on or before the 2nd of August.]—(See p. 164).

Fig. 1

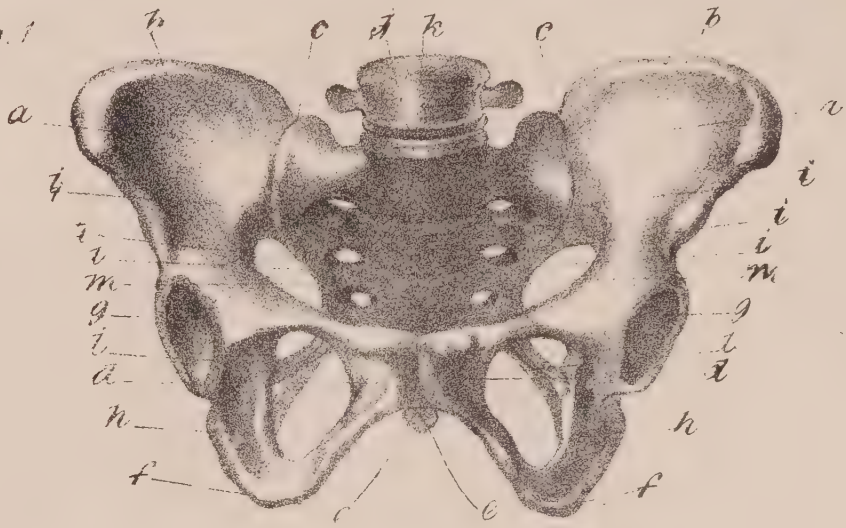


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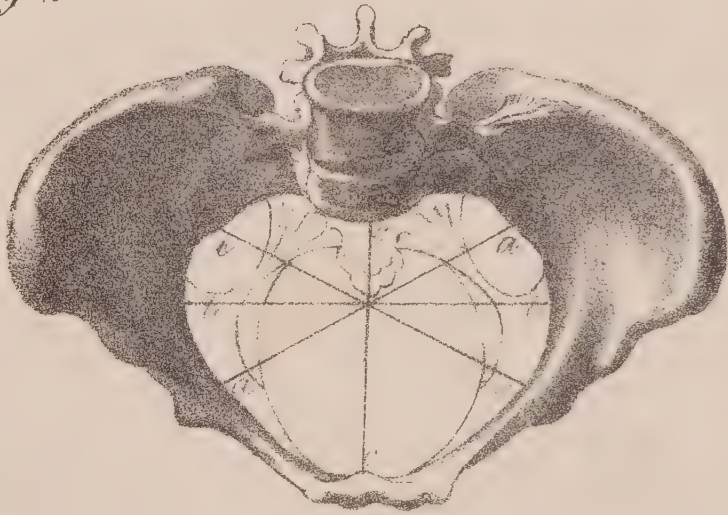
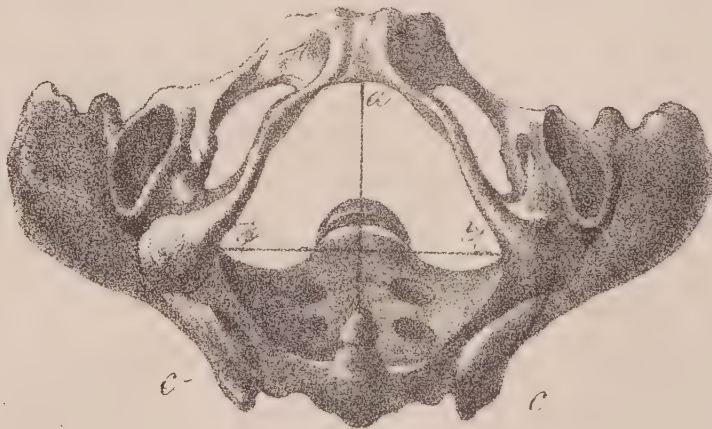


Fig. 3.



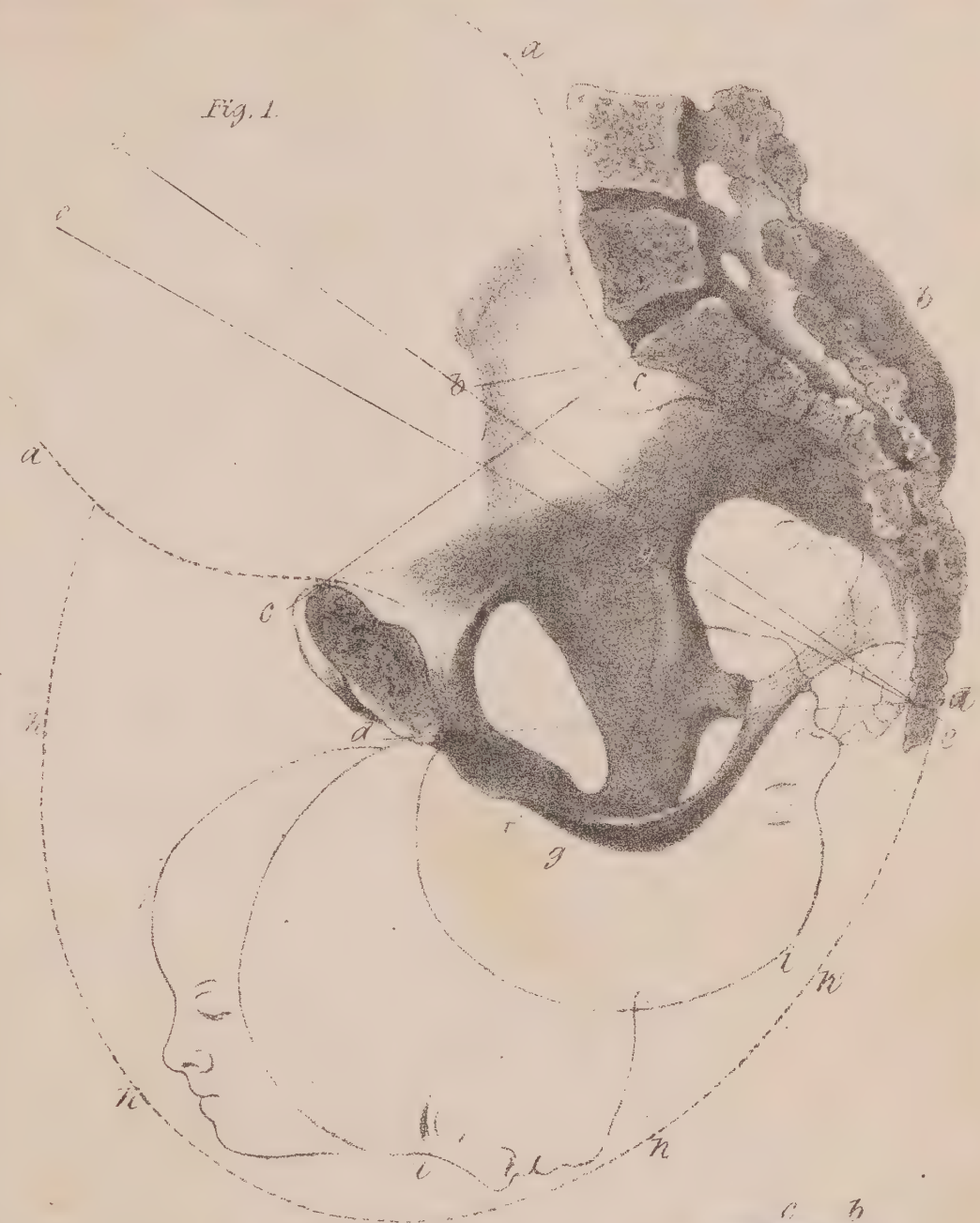


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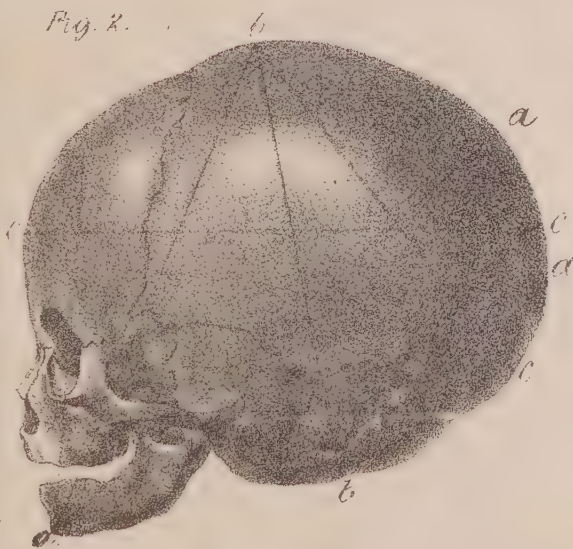


Fig. 3

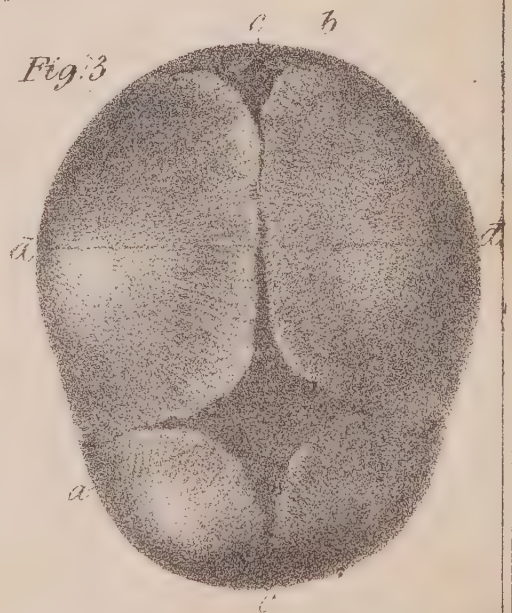


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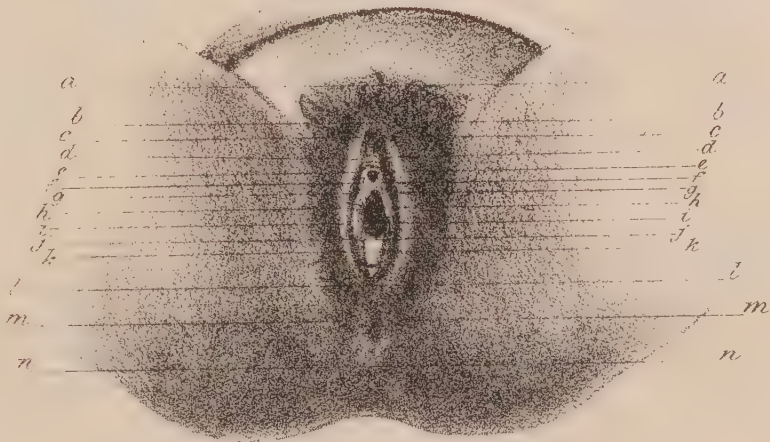


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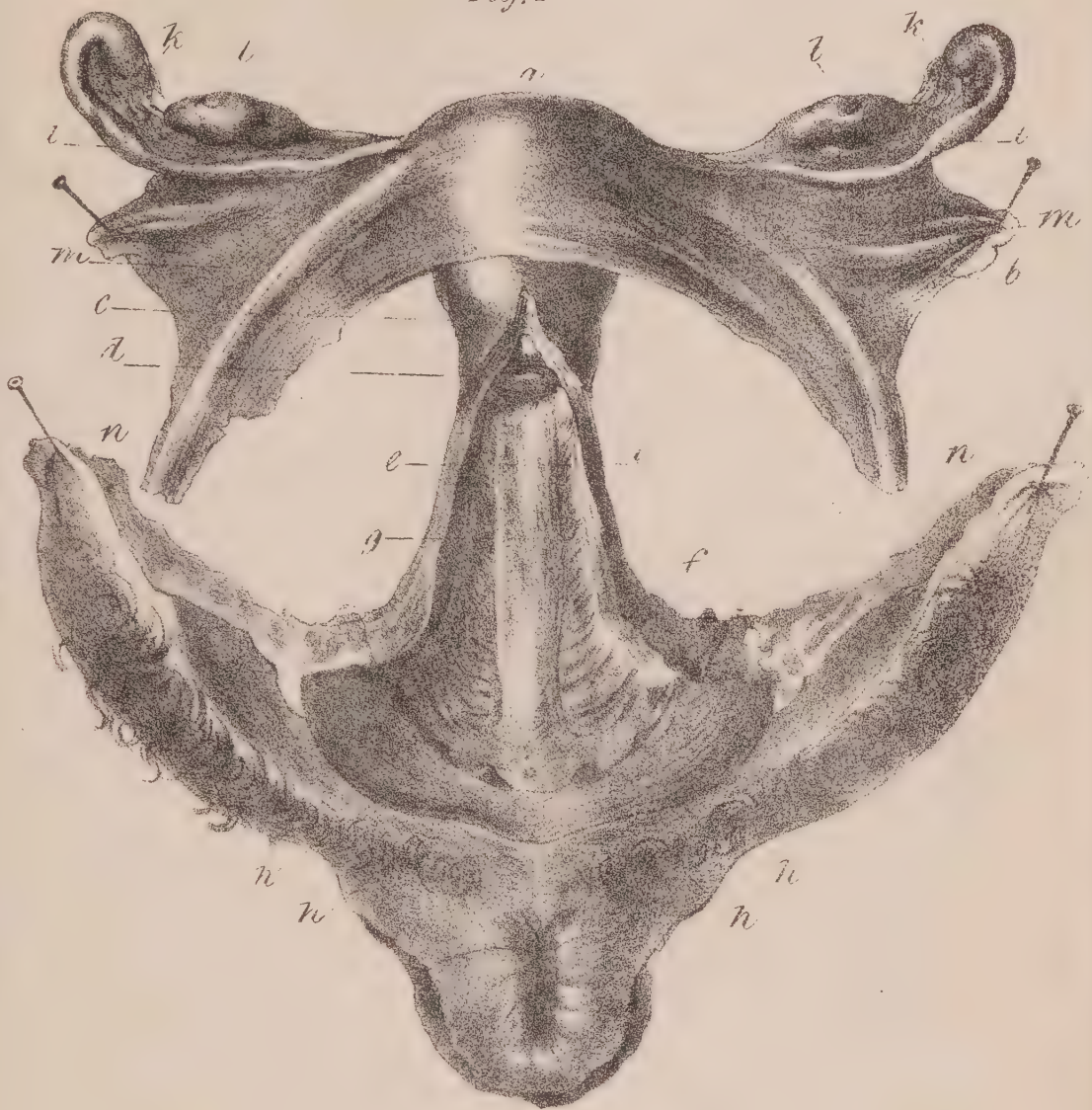


Fig. 2.





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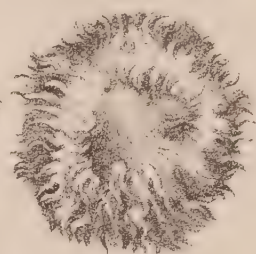


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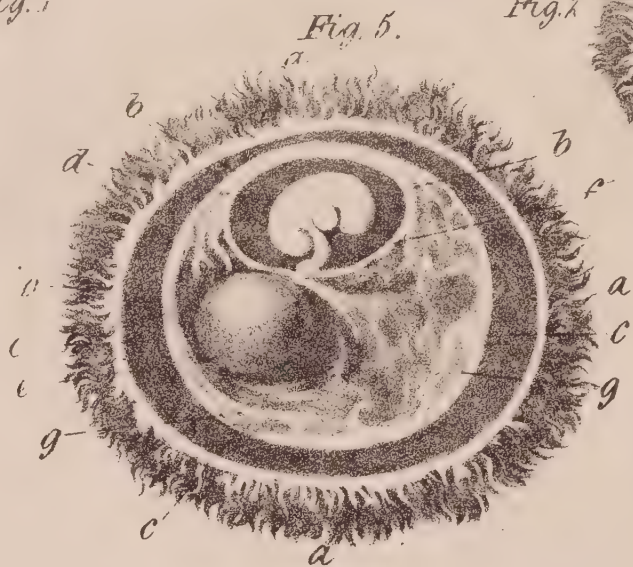


Fig. 5.

Fig. 3.



Fig. 4.

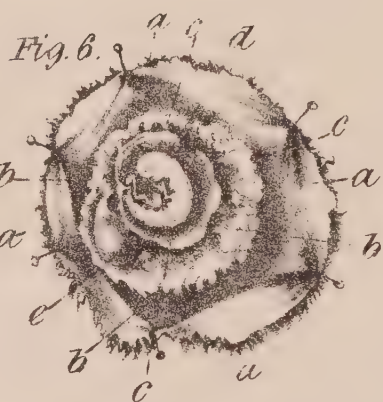
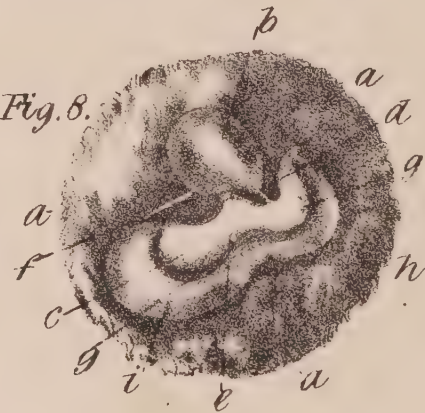


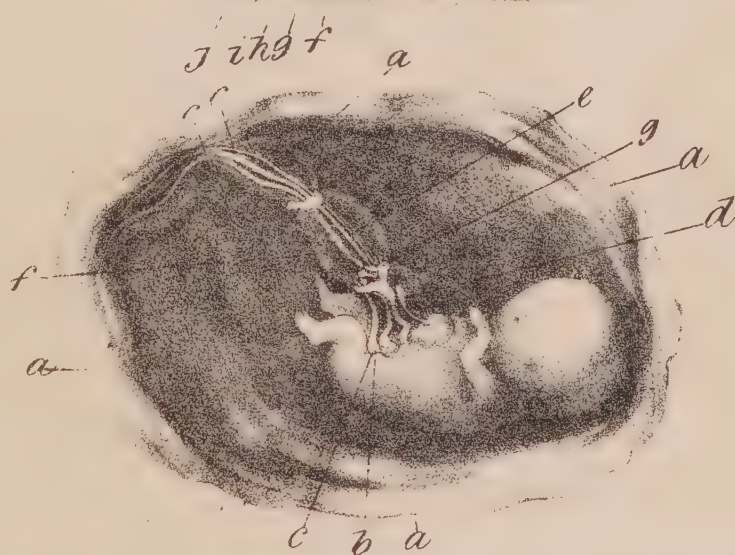
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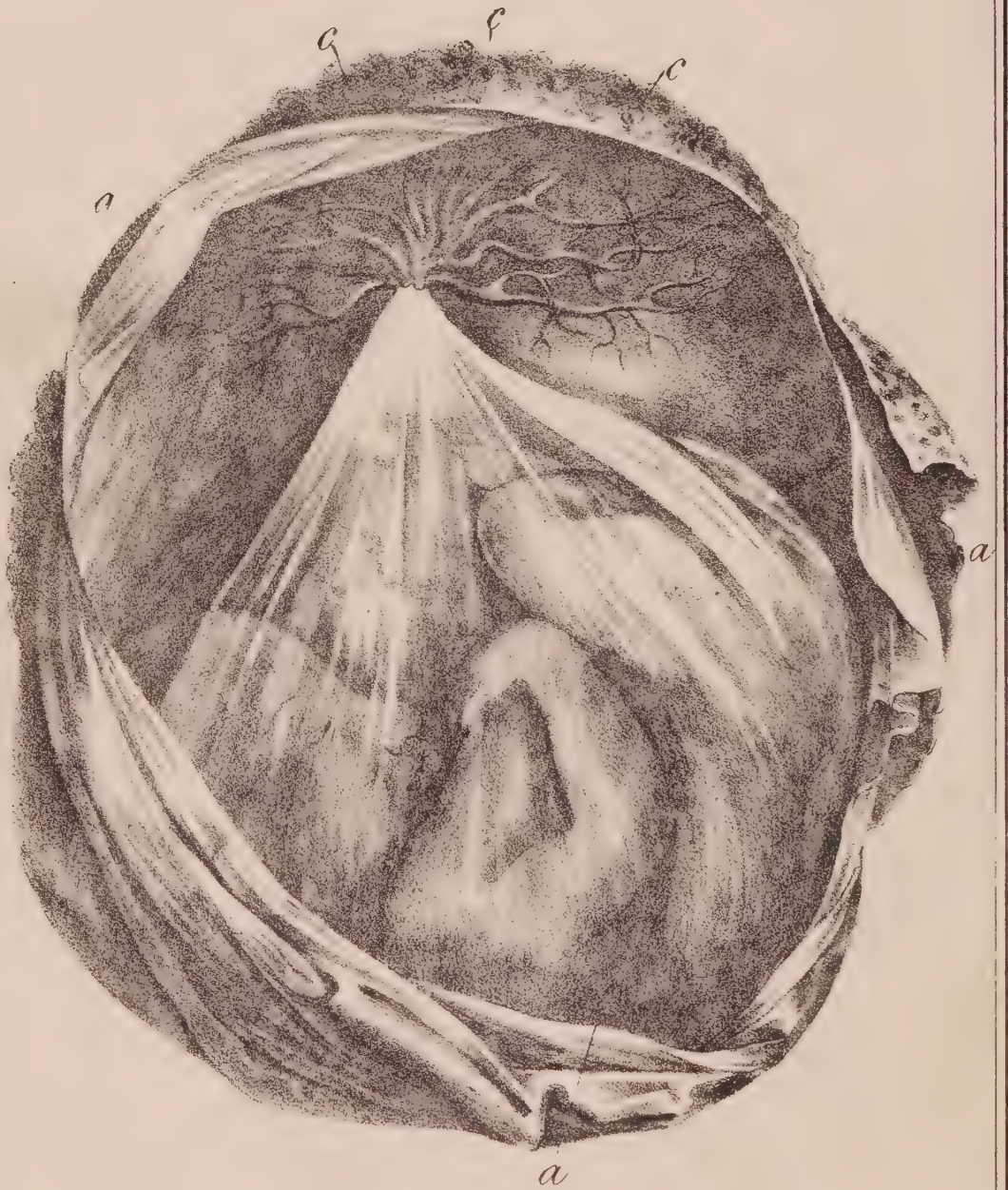
Fig. 7.



Fig. 8.







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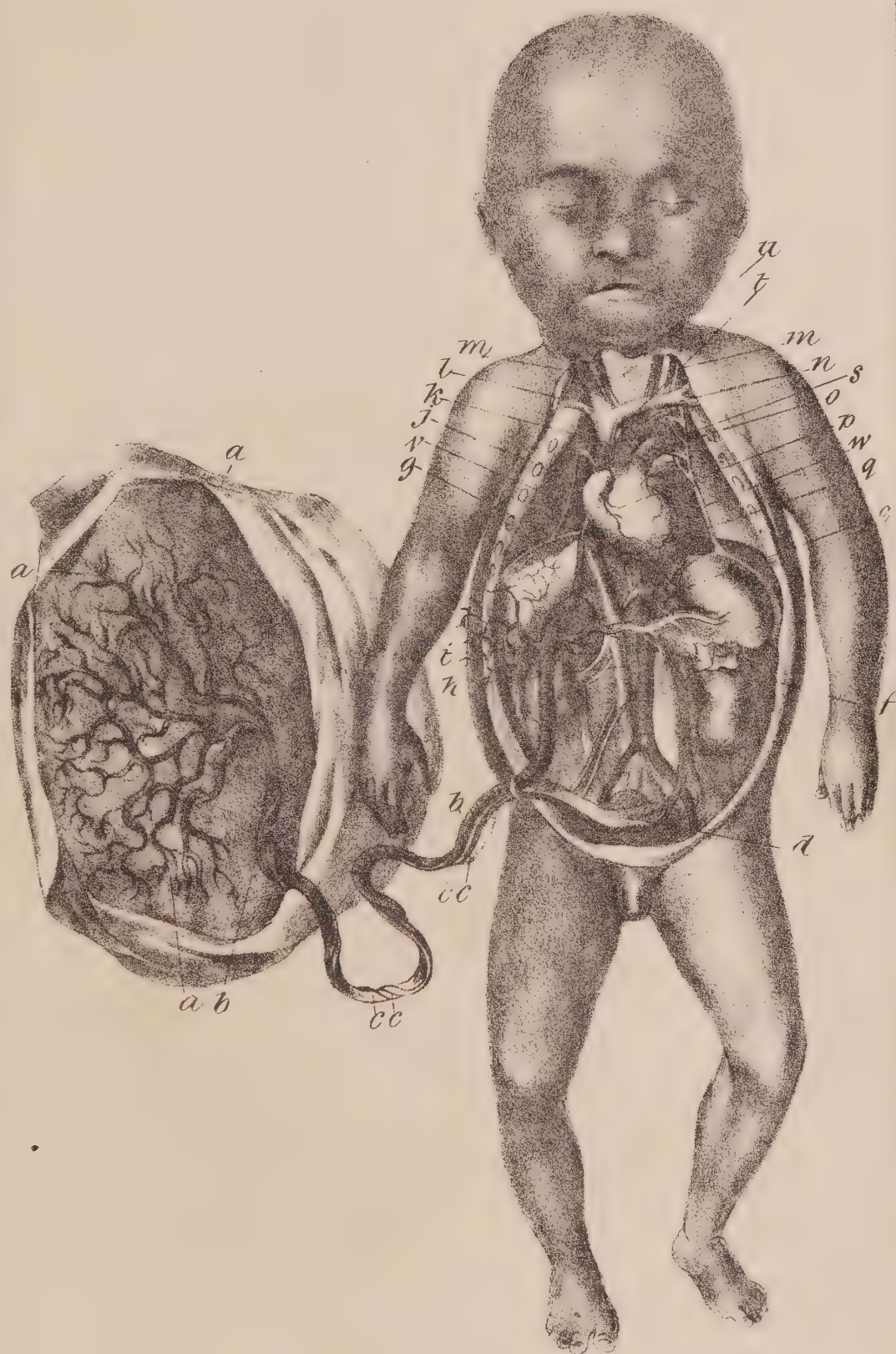




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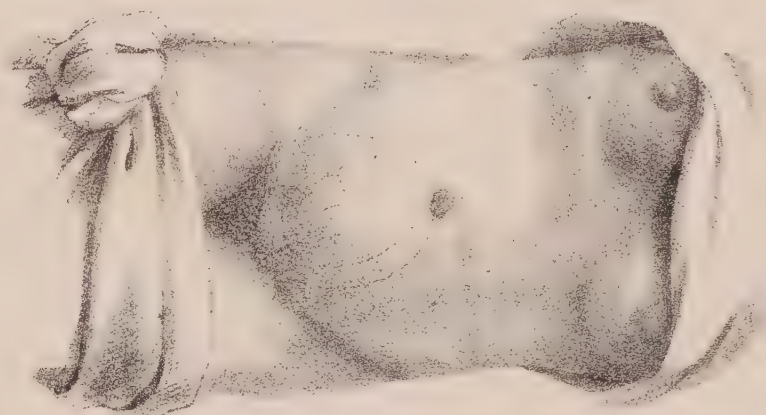


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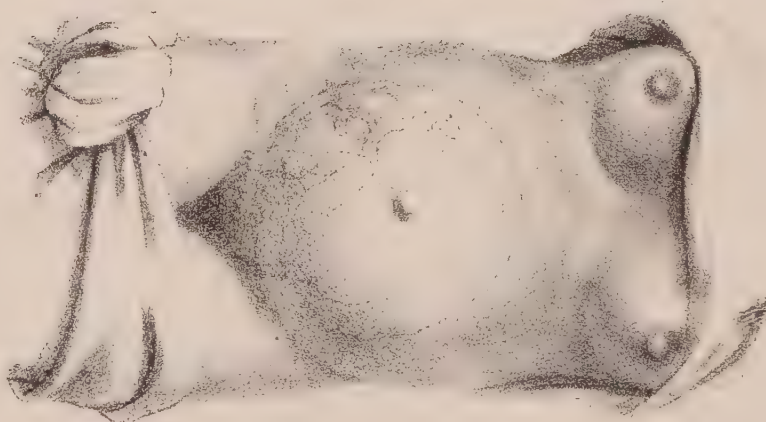
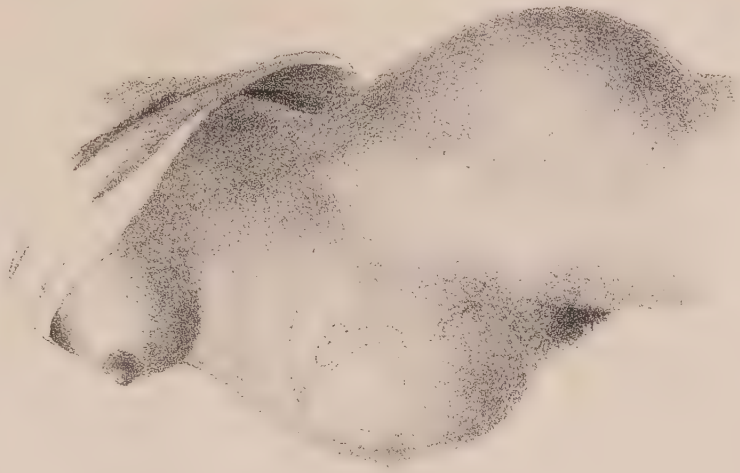


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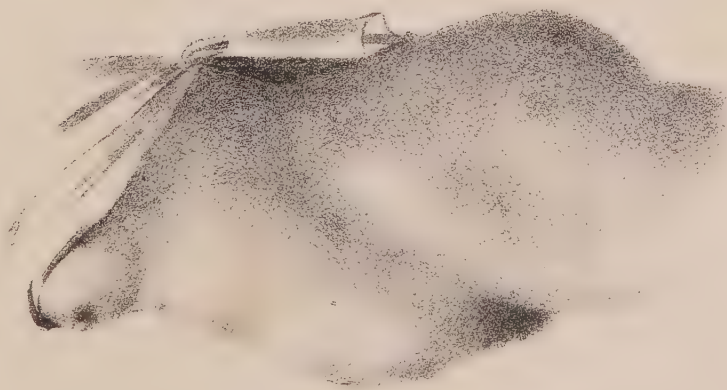
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Fig. 2.



6 ml

Fig. 1.



3 ml

Fig. 1.

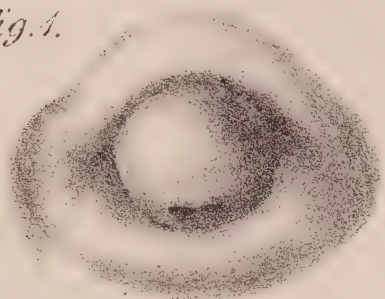


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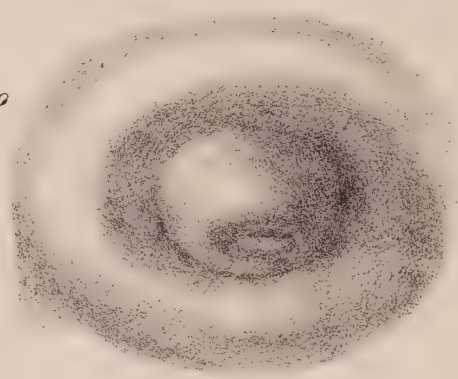


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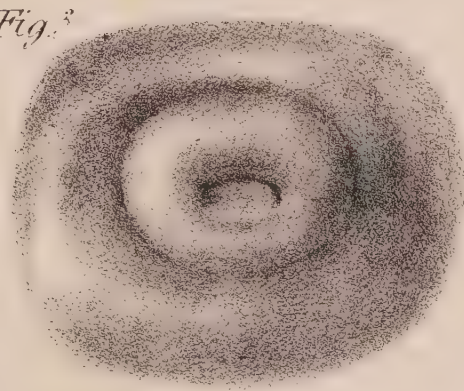


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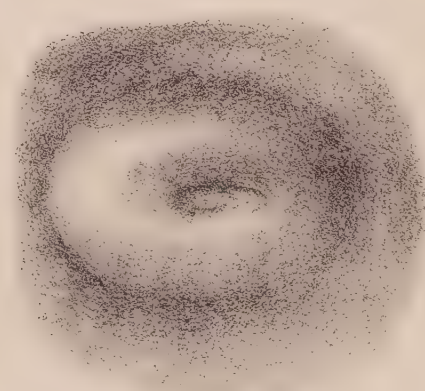


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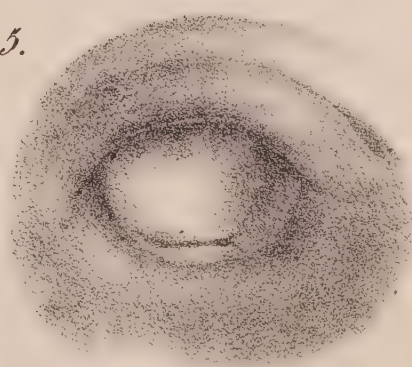
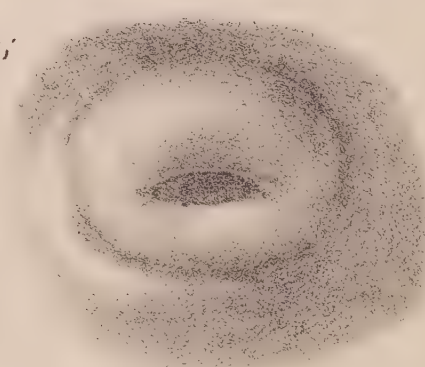


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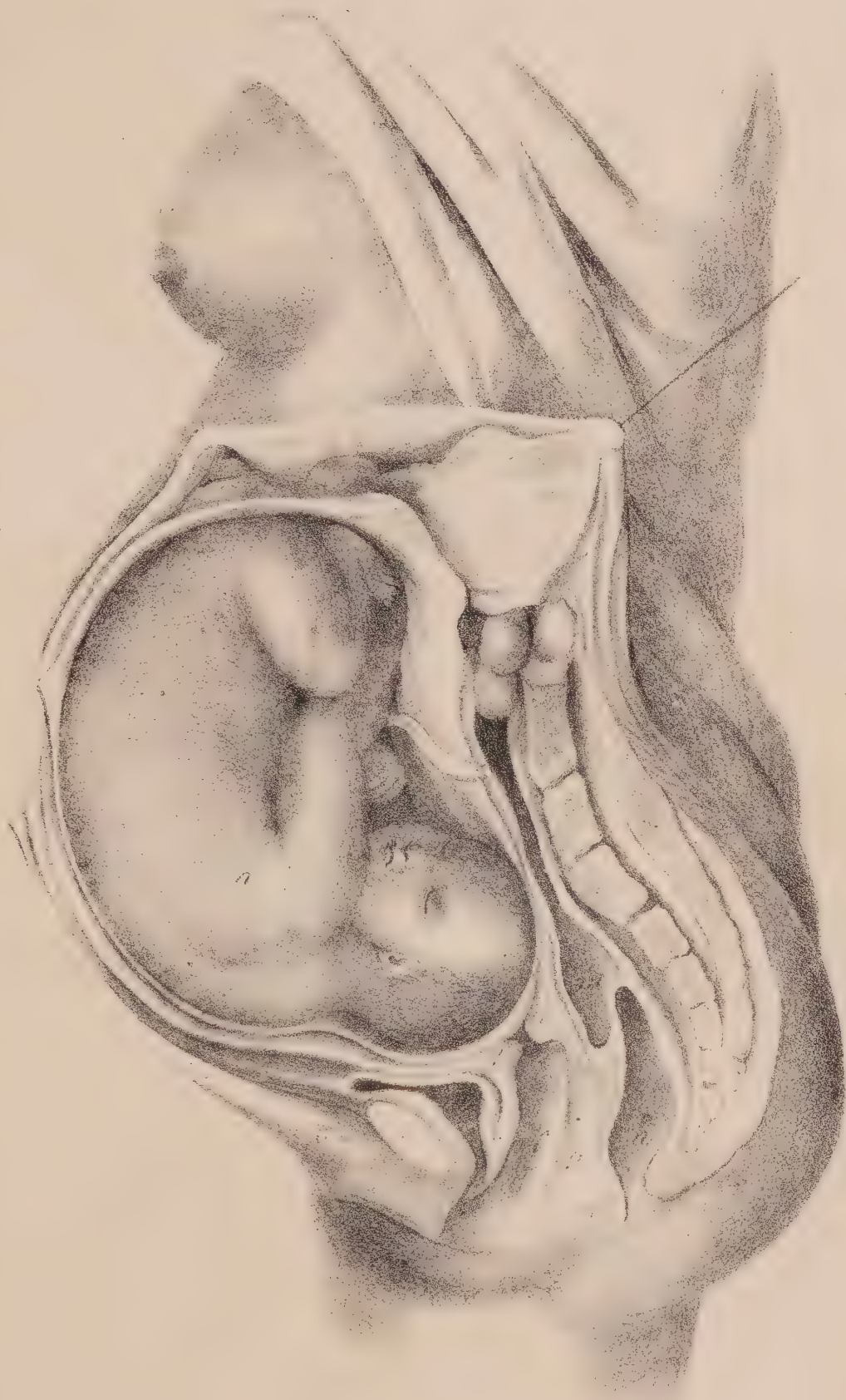


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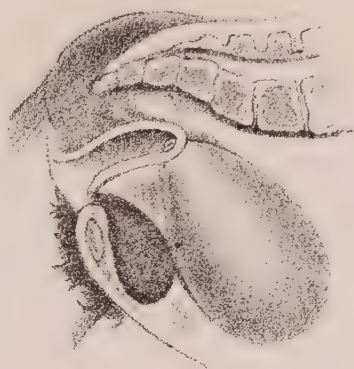


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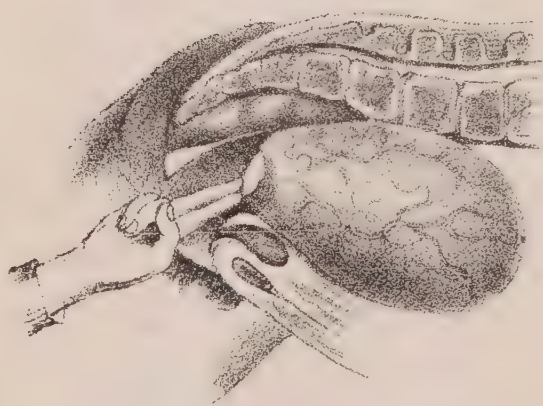


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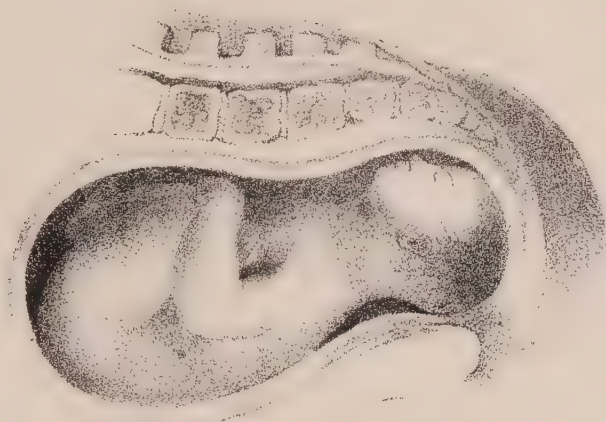


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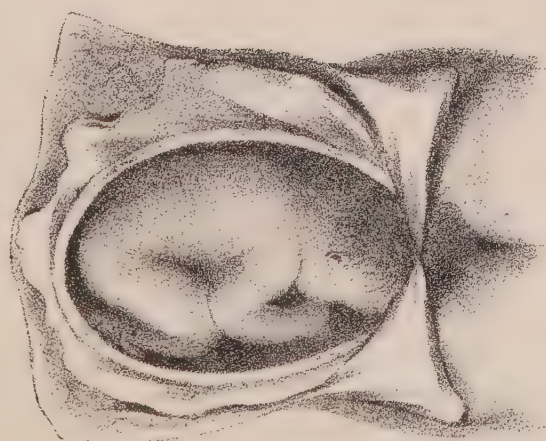


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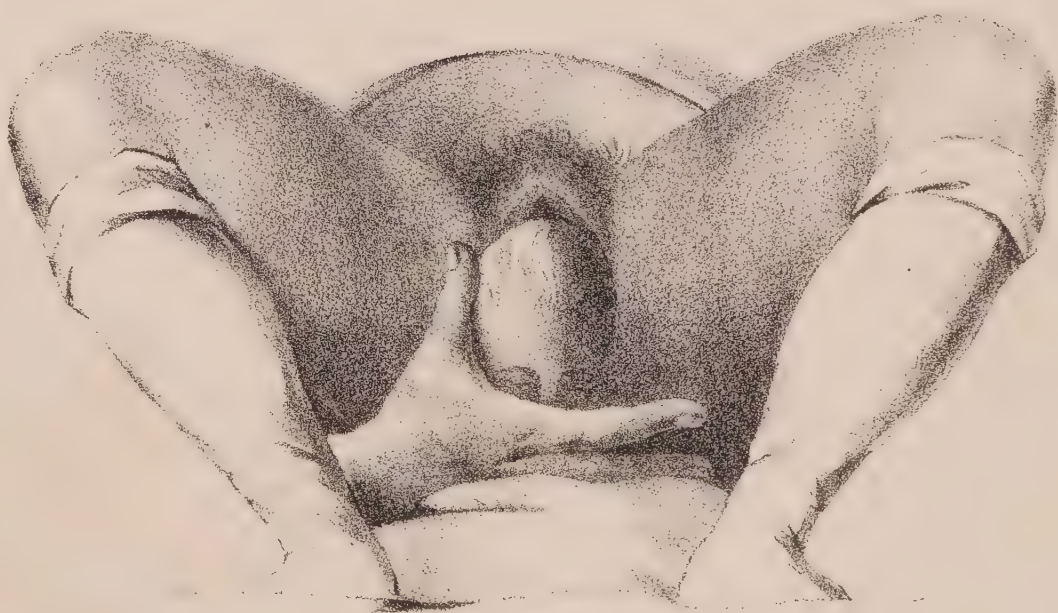


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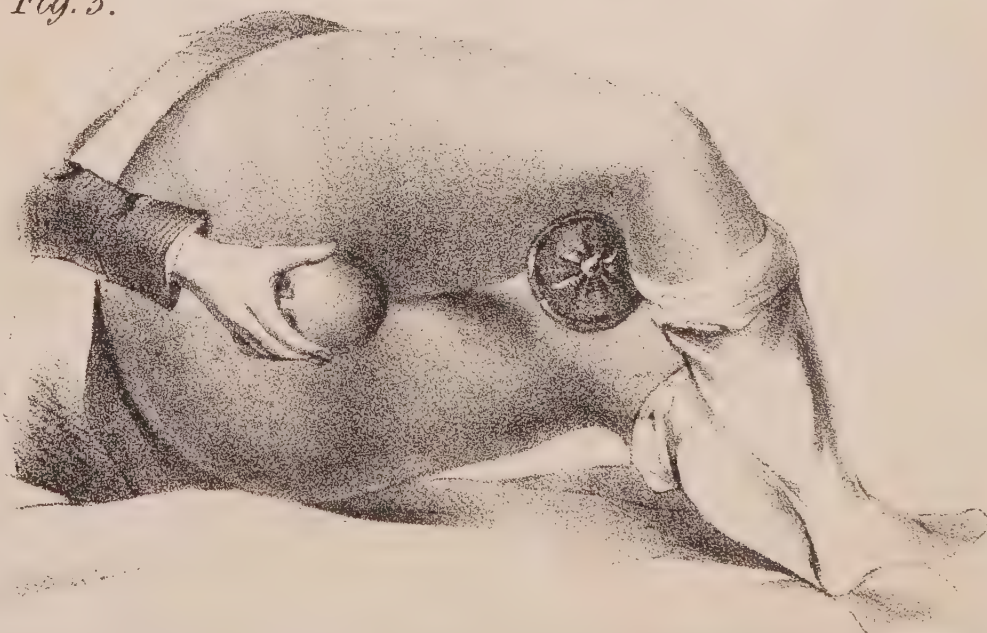


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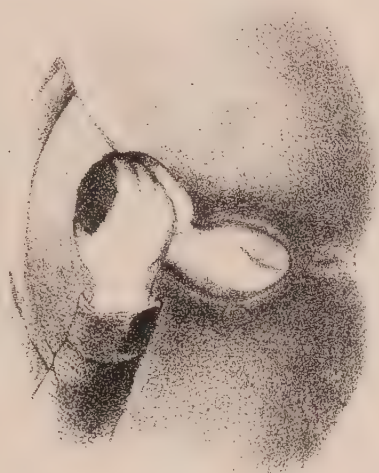


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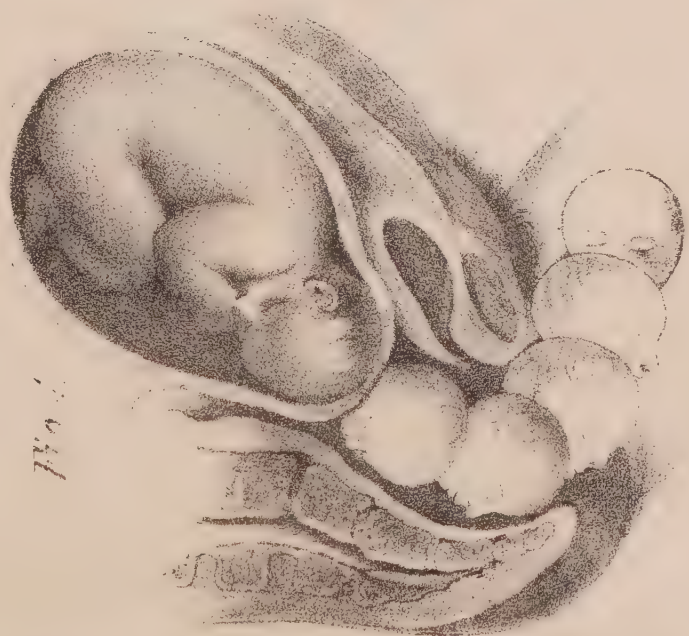


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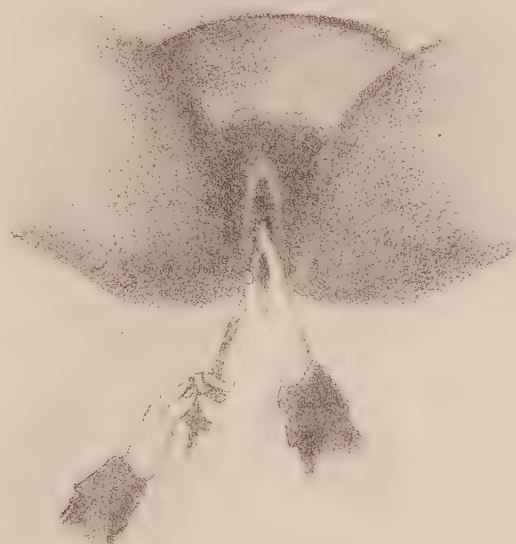


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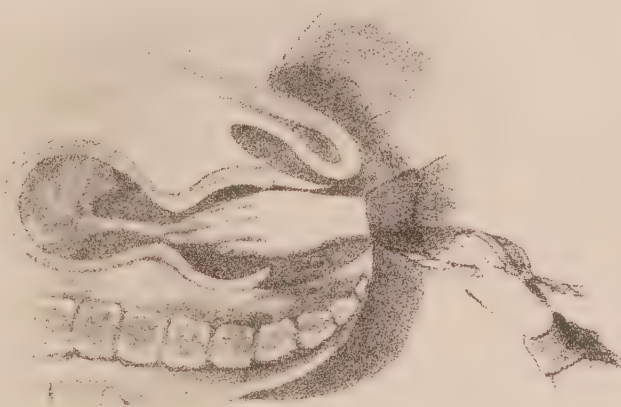


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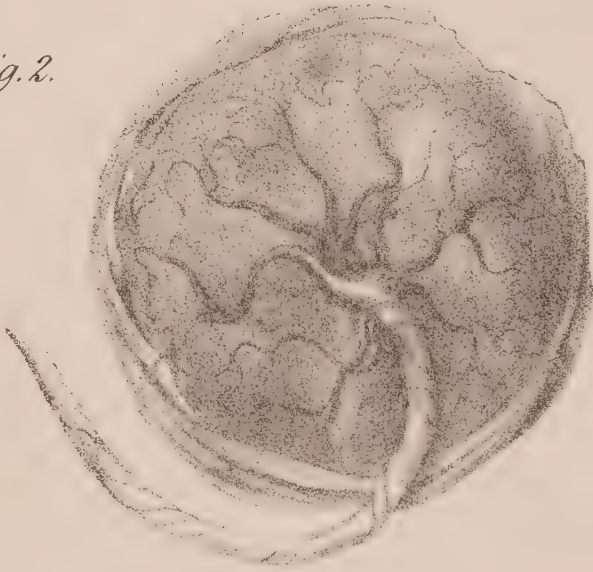


Fig. 3.



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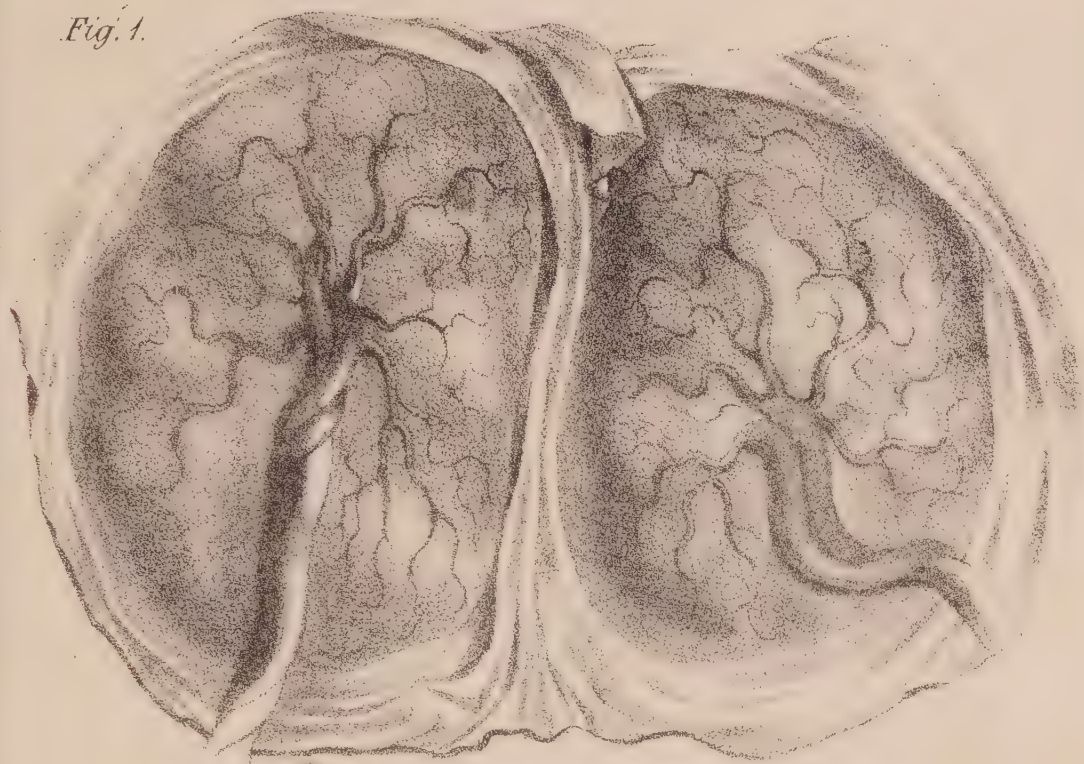
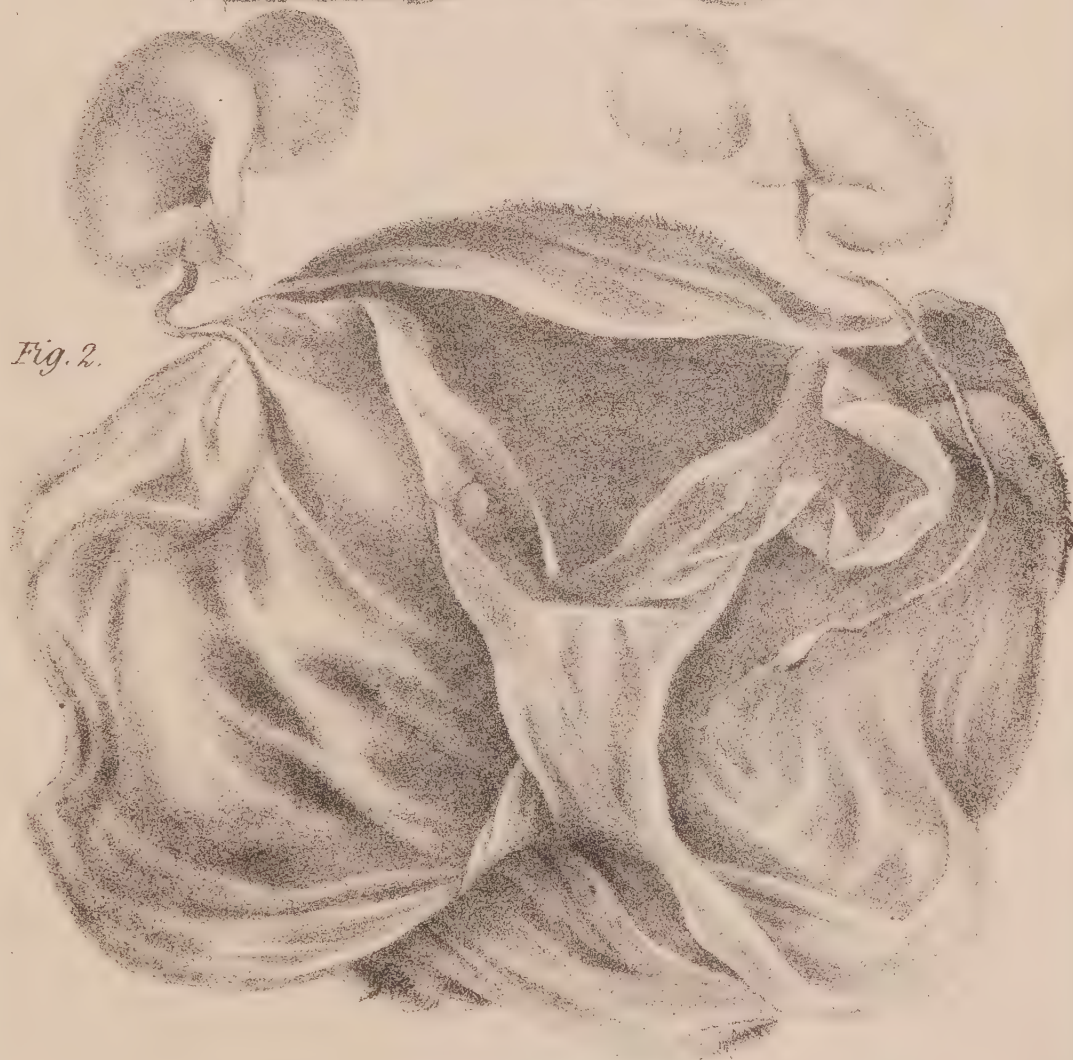


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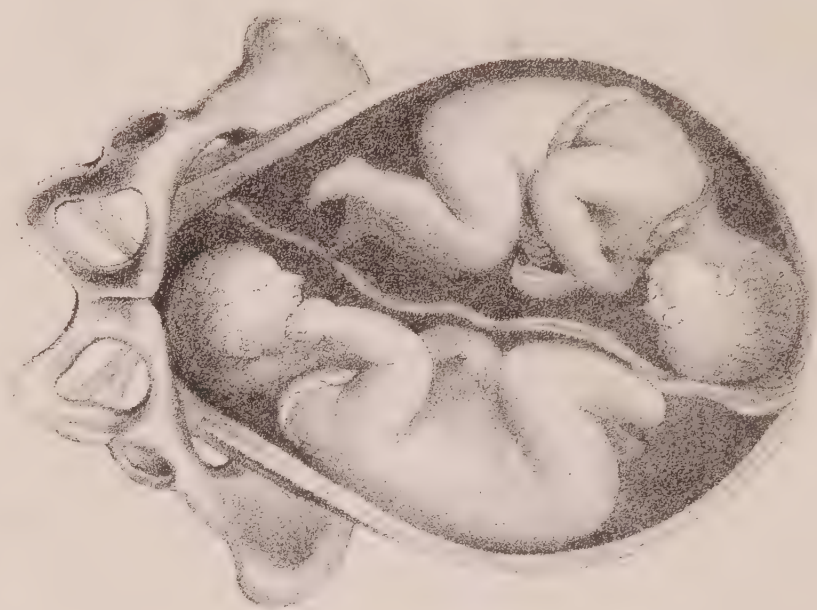


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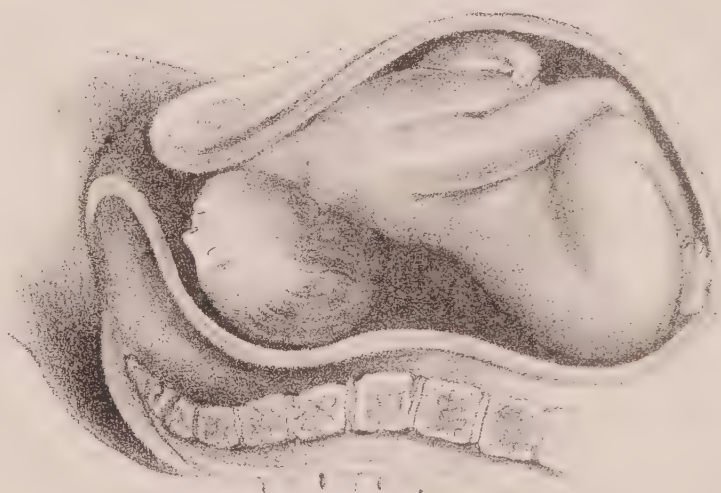


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Fig. 3.



Fig. 2.



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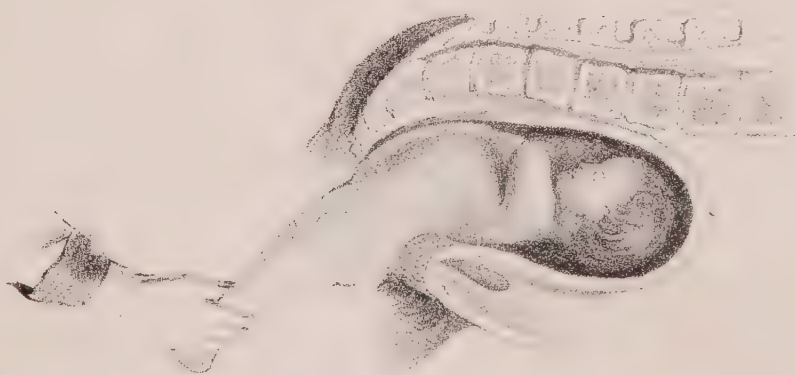


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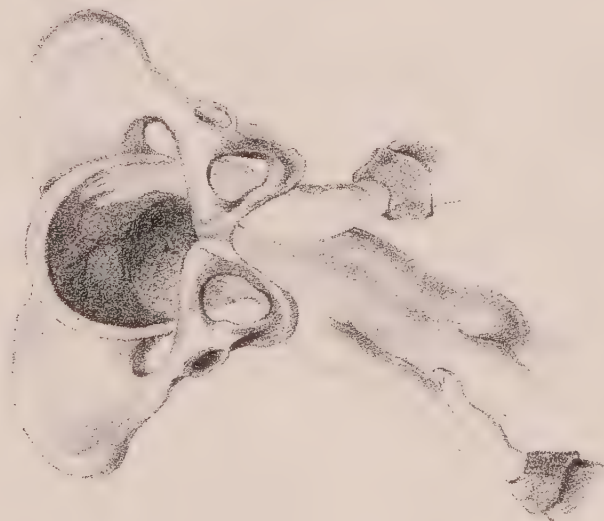


Fig. 3.

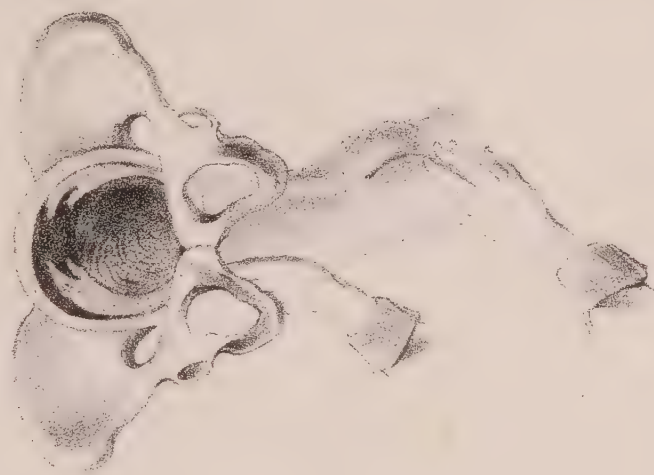




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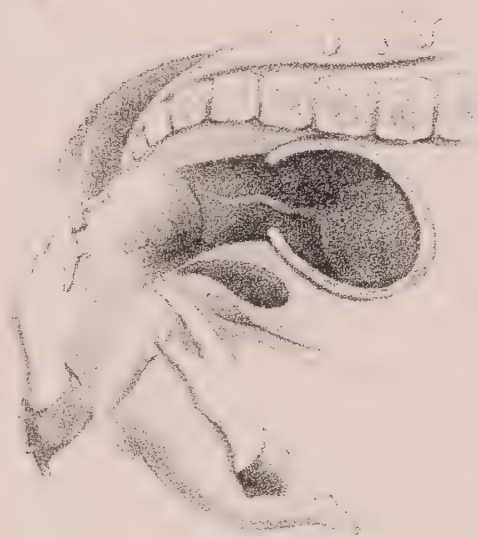


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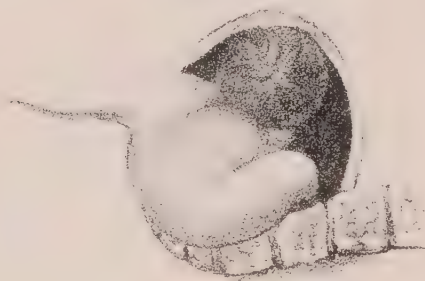


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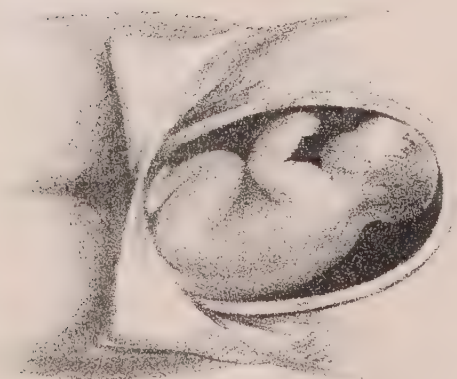


Fig. 4.



Fig. 1.



Fig. 2.



Fig. 3.

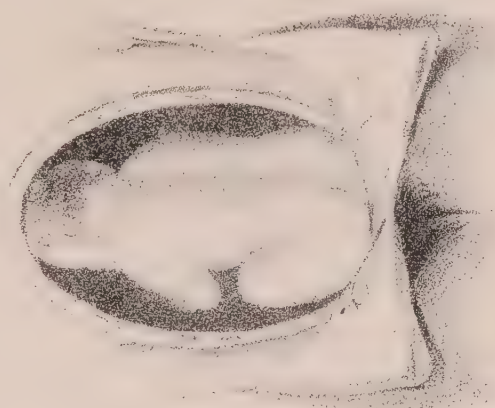


Fig. 4.



Fig. 1.

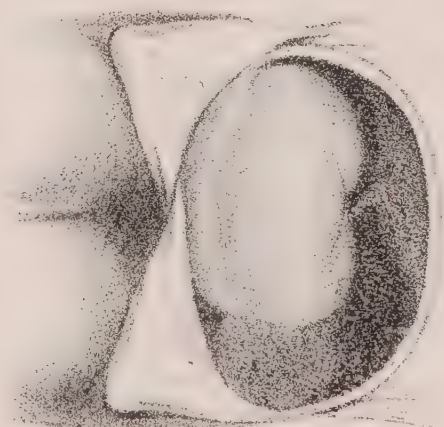


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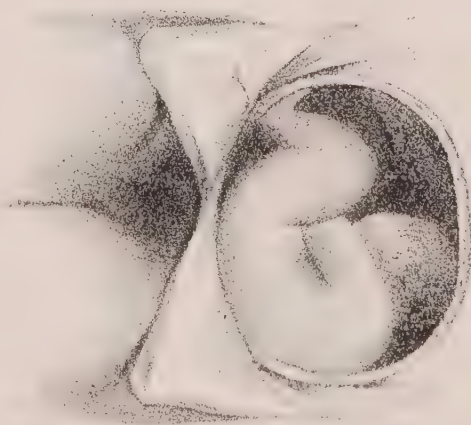
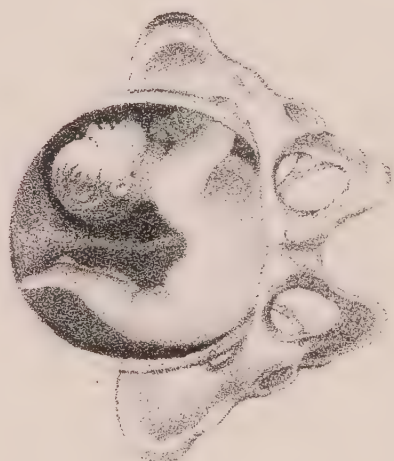


Fig. 3.

Fig. 3.*Fig. 2.**Fig. 1.*

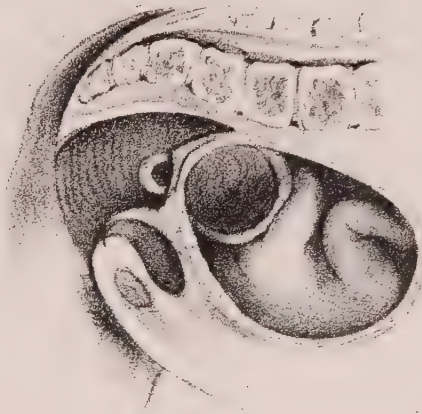


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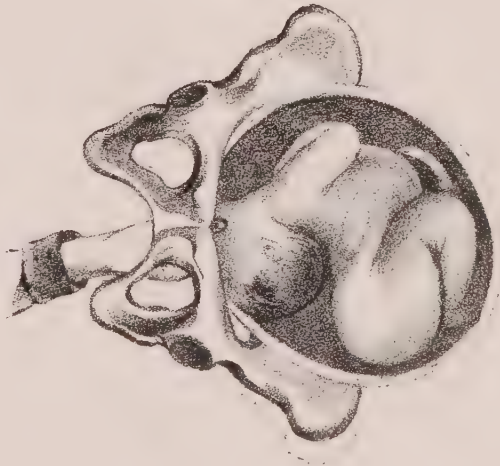


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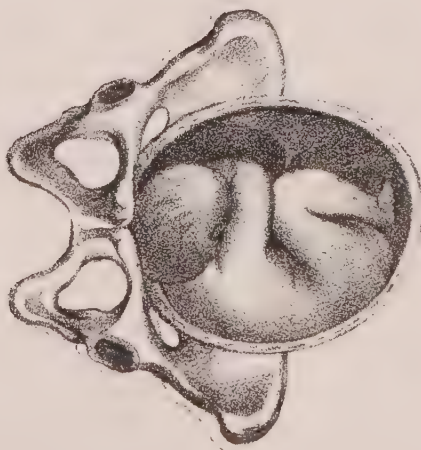


Fig. 3.

Fig. 3



Fig. 2.

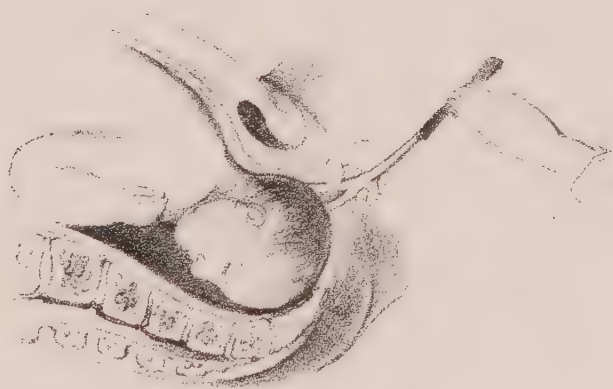
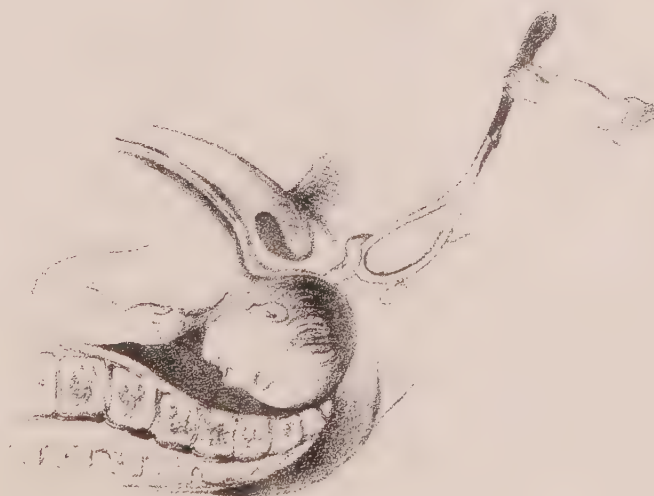


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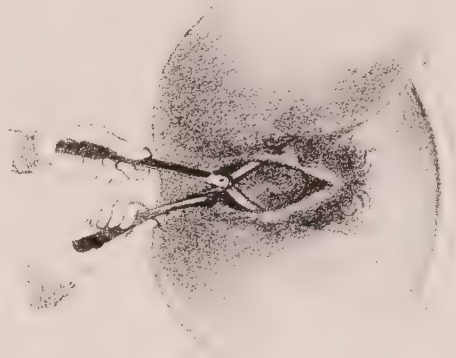


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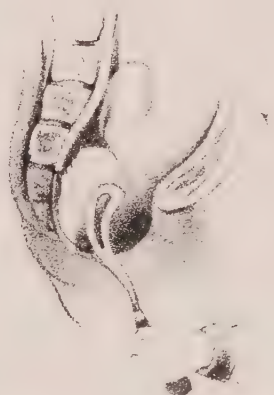


Fig. 2.



Fig. 3.

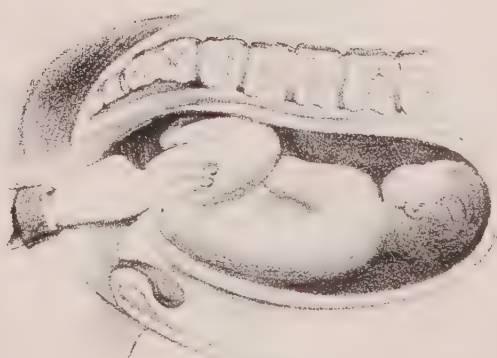


Fig. 4.

Fig. 1.



Fig. 2.

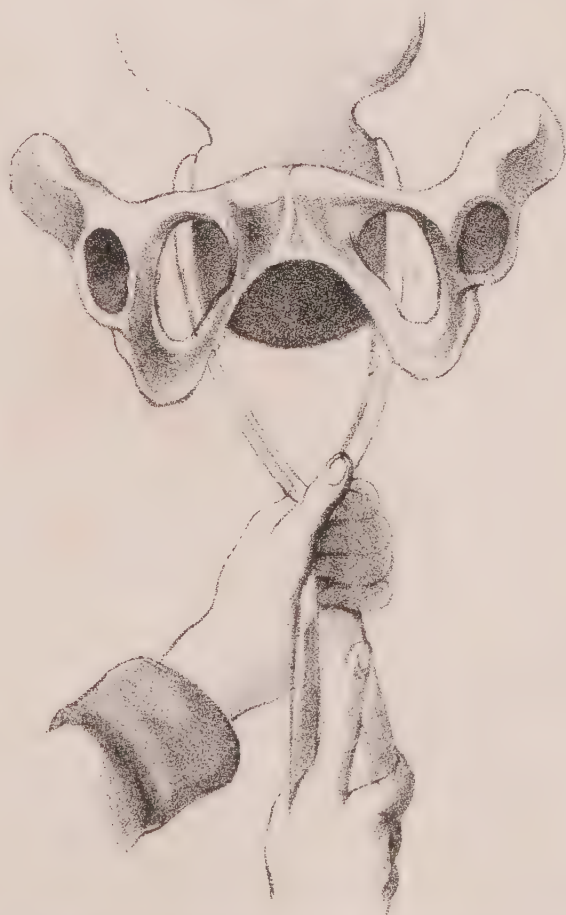




Fig. 1



Fig. 2



Fig. 3

Fig. 3

Fig. 1.

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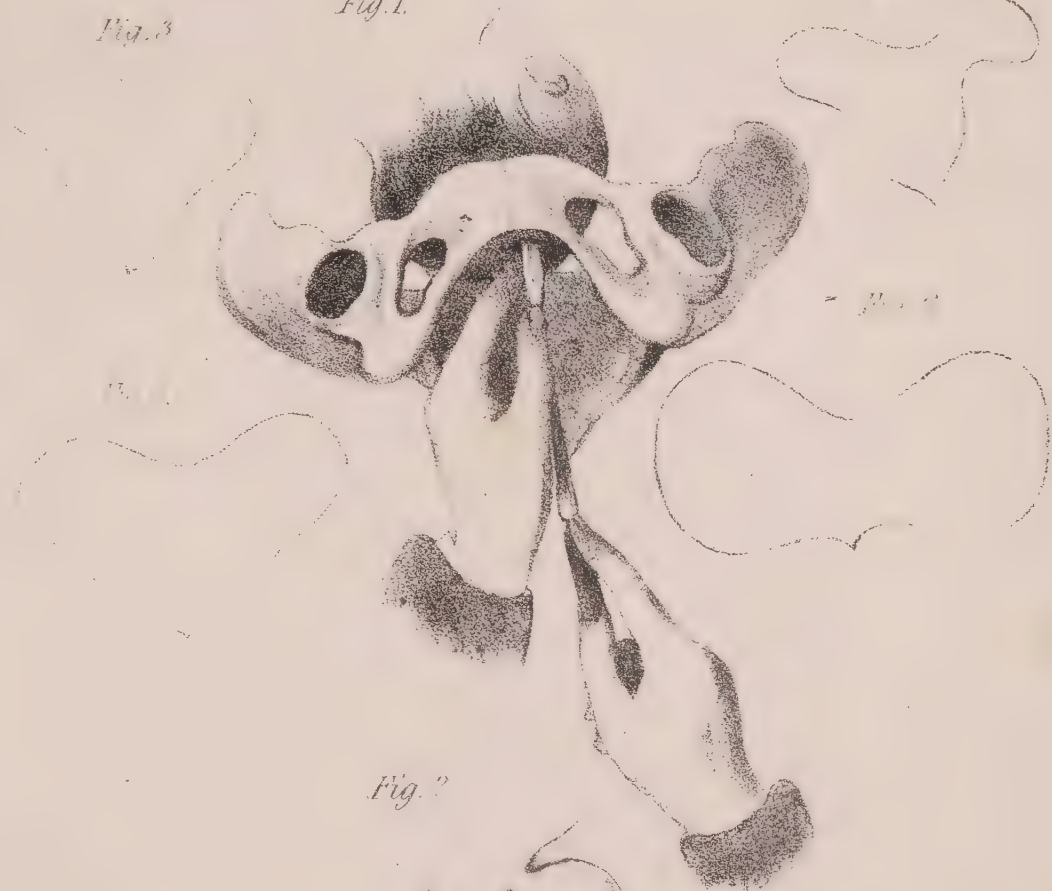


Fig. 2

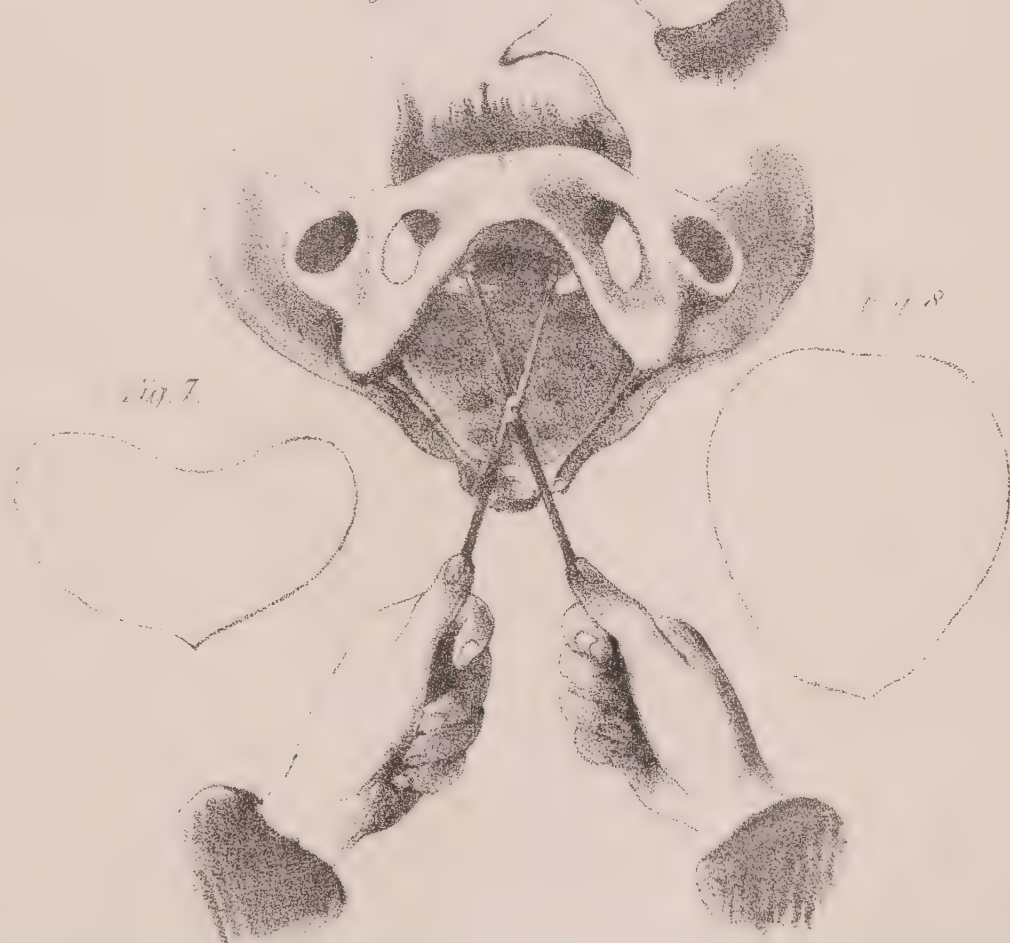




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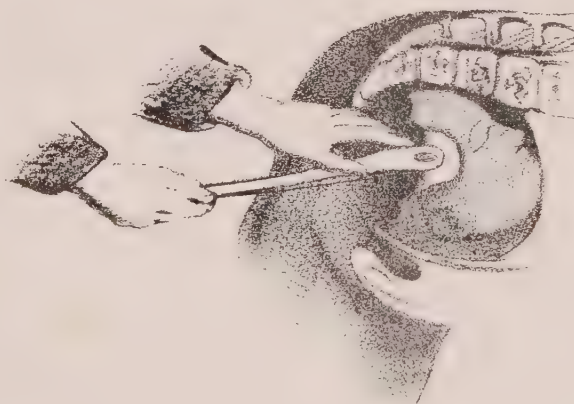


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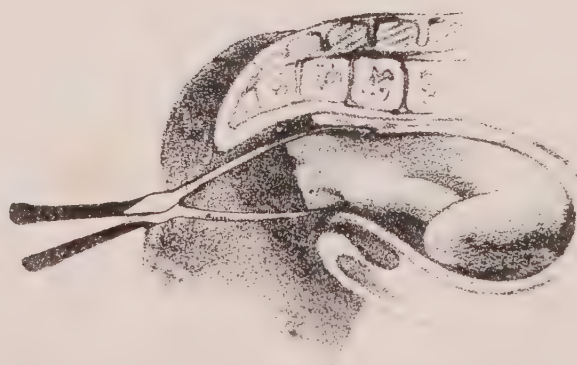


Fig. 3.

Fig. 3.



Fig. 2.



Fig. 1.



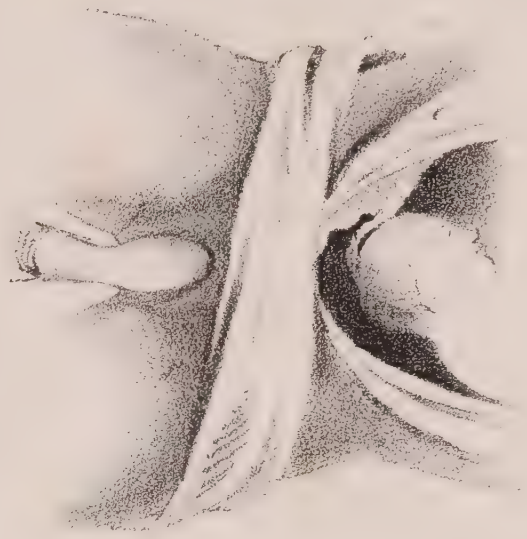


Fig. 1.



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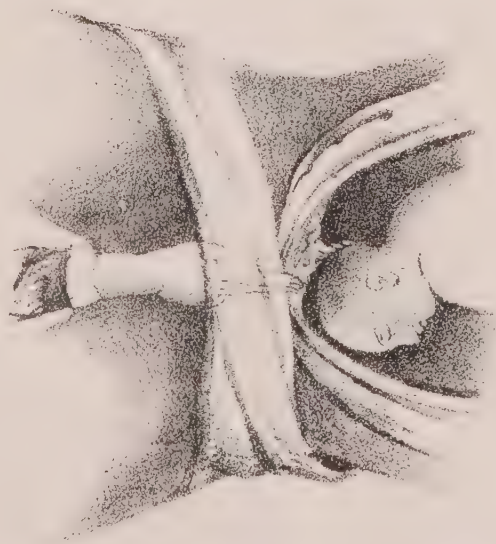


Fig. 3.

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Fig. 3.

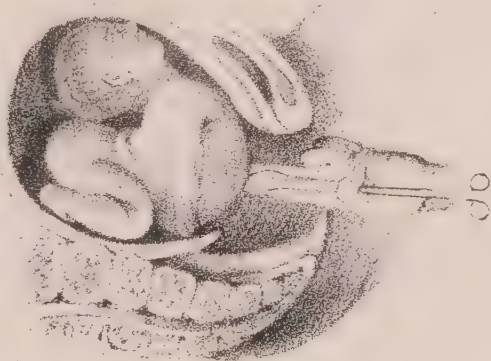


Fig. 2.

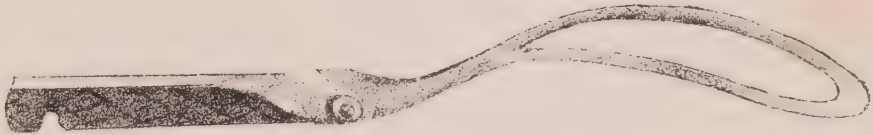


Fig. 1.





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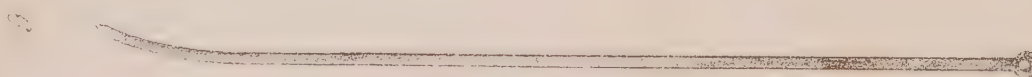
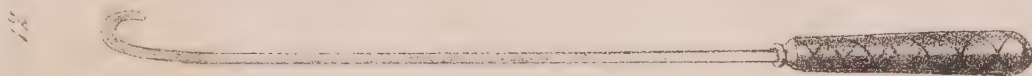
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6





EXPLANATION OF THE PLATES.

PLATE I.

Fig. 1.—The pelvis of the adult human female.

- a a.* The iliac fossa.
- b b.* The crest of the ilium.
- c c.* The sacro-iliac joints.
- d d.* The symphysis pubis.
- e e.* The arch of the pubis.
- f f.* The tuberosities of the ischia.
- g g.* The acetabula or cotoloid cavities.
- h h.* The thyroid foramina.
- iii.* The foramina of the sacrum, through which the anterior sacral nerves pass into the pelvis.
- j.* The promontory of the sacrum.
- k.* The last lumbar vertebræ.—(See page 9 to page 16).

Fig. 2, a a a a. The oblique diameters of the brim or superior aperture of the pelvis.

b b. The transverse diameter of the same part.

c c. The sacro-pubic, the conjugate, or short diameter of the brim.—(See page 16).

Fig. 3, a a. The coccy-pubic, or long diameter of the outlet, or inferior aperture of the pelvis.

b b. The bis-ischiatic, or transverse diameter of the outlet of the pelvis.

a b c. Shows the quadrangular, or somewhat cordiform appearance of the outlet.—(See page 19).

PLATE II.

Fig. 1, a a. The gravid uterus.

b b. The plane of horizon.

c c. The plane of the brim of the pelvis.

d d. The plane of the outlet.

e e e. The axis of the brim, or superior entrance of the pelvis.

f f. The axis of the outlet, or inferior aperture of the pelvis.

g g. The axis of the cavity of the pelvis.

h h h. The curved line formed by the lines *e e*, *f f*, *g g*, extending from the coccyx to the abdomen, on which the infant's head passes during parturition.—(See page 20, see also plates 15, 16).

Fig. 2. The head of the fœtus, measured in every possible direction.

a a. The occipitomentonary diameter, or the space extending from the back of the head to the chin, which may be the presenting part when the infant is born by the feet.

b b. The diameter, extending from the vertex or crown to the base of the cranium.

b a. The measurement from the vertex to the chin.

b c. The measurement from the vertex to the occipital protuberance.—(See p. 22).

Fig. 3, a. The anterior fontanelle, or opening of the head.

b. The posterior fontanelle.

c c. The sagittal suture, or separation of the bones from the forehead to the back of the head.—(See pages 22 and 23).

PLATE III.

Fig. 1, a a. The mons veneris.

b b. The anterior superior commissure of the external genital aperture.

c c. The clitoris and its prepuce.

d d. The external labia continued to *ll*, or the inferior commissure of the external genital fissure.

e e. The meatus urinarius, or external orifice of the urethra.—(See Catheterism, pages 43, 439, 440).

f f. The labia minora, or nymphæ.

g g. The vestibulum, a triangular space, about an inch in extent, behind the glans of the clitoris, and between the nymphæ. Celsus and Lisfranc have proposed to perform lithotomy through this space, but I am not aware whether this plan has ever been adopted.

h h. The orifice of the vagina.

i i. The crescentic margin of the hymen.

j j. The hymen, or circulus membranous.

k k. The continuation of this membrane, terminating in a triangular space inferiorly, which is called the fourchette, or frœnum labiorum, which is often lacerated during the functions of reproduction and parturition.

k l. The space between these letters, the frœnum excluded, is termed fossa navicularis.

l m. The space between these letters is

termed the anterior perineum, which is about one inch and a half in length.

m m. The superior verge of the anus.

n n. The space beyond the line between these two letters is termed the posterior perineum, which, with the anterior and the anus, are greatly distended during the passage of the infant's head,—(see plate 15, figs. 1, 2, 3), requiring the pressure of the hand, as represented in figs. 2 and 3, to prevent the laceration of these parts,—(see pages 41 to 48).

Fig. 2. Lateral view of the internal and external organs of generation.

a. The fundus uteri.

b. The bladder.

c. The rectum, or lower portion of intestine.

d. One of the surfaces of the pubic joint.

e. The orifice of the urethra.

f. The labium externum.

g. The vagina, showing its lacunæ, or folds, which are capable of considerable dilatation during the functions of reproduction and parturition.

h. The recto-vaginal septum, which is sometimes so contused by the descent of the foetus during labour, as to become inflamed and gangrenous when a greater or less portion will be thrown off by sloughing, causing the loathsome disease termed recto-vaginal fistula. I have attended a most remarkable case of this kind with Dr. Ashwell, which terminated favourably.—(See pages 286, 301, 306).

PLATE IV.

Fig. 1. Internal organs of generation—the uterus.

a. The fundus uteri.

b. The corpus uteri.

c. The cervix uteri.

d. The os uteri.

e e. The vagina laid open, showing the septum on its inferior surface.

f. The lacunæ on the left side of the septum.

g. The lacunæ, or folds, on the right side of the septum.

h h h h. The carunculæ myrtiformes, which are not the remains of the hymen, they exist in cases of infants of a tender age, in whom the hymen is present or absent.

i i. The Fallopian or uterine tubes.

k k. The fimbriated extremities of the uterine tubes.

l l. The ovaries.—(See pages 52, 409 to 422).

m m. The broad ligaments.

n n. The round ligaments.—(See pages 48 to 54, 421).

Fig. 2. A tubal pregnancy, proving the received doctrine of human generation.—(See pages 109, 110).

PLATE V.—OVOLOGY.

Fig. 1. An ovule supposed to be about twelve days old; copied from M. Velpeau.

Fig. 2. The same magnified.

Fig. 3. An ovule about the same age, but somewhat differently developed.

Fig. 4. The same opened and magnified.

Fig. 5. The same very much magnified.

a a a a. The villousities of the chorion.

b b. The amnios surrounding the ovule.

c c. The space between the chorion, amnios, and allantois.

d. The embryo.

e. The vesicula umbilicalis.—(See page 131).

f. The umbilical cord.

g g. A reticulated substance, called allantois, placed between the chorion, *a a a a*, and the amnios, *b b*.

Fig. 6. An ovule of about three weeks old, dissected.

a a a a. The chorion.

b b. The reticulated body.

c c c. The amnios.

d. The embryo.

e e. The vesicula umbilicalis entering the abdomen of the ovule.

The late Mr. Millar, who examined 127 human ova, in the first days of conception, found only four of them normal or natural: he paid great attention for many years to the investigation of human and comparative ovology, though only a mechanic, but his conclusions are questioned by many of the profession.

The following account was published by him in the London Medical Journals, Nov. 11, 1837: the ovum which he examined weighed four grains, and was five lines in diameter.

Fig. 7, a a a a. The chorion.

b b. The flocculent chorion.

c. The germinal disk, three lines in diameter.—(See page 111).

d. The puckering of the disk.—(See pages 111, 119, 120, 122, 123, 126). For the development of the ovule and uterus see pages 129, 160.

Fig. 8, a a. The chorion.

b. The vesicula umbilicalis.

c. The germ, three lines in length.

d. The duct from the vesicle into the germ.

e. A vessel from the vesicula, in a direct line, to the nearest part of the head of the germ.

f. The amnios, at the end of which is the formation of the urachus.—(See page 130).

g. The allantois.—(See page 131).

It is here to be observed, that the greatest discrepancy still exists amongst the ablest physiologists with regard to the natural economy of human ovology, and as yet they have not arrived at any satisfactory or positive conclusions upon this subject.

PLATE VI.—EMBRYOLOGY.

Fig. 1. Copied from Wrisberg.

- a a.* The cavity of the chorion.
- b b.* The rudiments of the placenta.
- c.* The vesicula umbilicalis partly covered by the amnios, *d.*
- e.* The pretended bifurcation of the vitelline cord. The natural appearance of the viscera in the chest and abdomen may be observed in this plate.

Fig. 2. An embryo of six weeks old.

- a a.* The chorion.
- b.* The origin of the placenta.
- c d.* Swellings containing gelatinous fluid.
- e.* A swelling approaching to the umbilicus, or navel, which sometimes contains a portion of intestine.
- f.* The umbilical vein under the liver.
- g.* A part of the digestive tube near the stomach.
- h i.* The two umbilical arteries.
- j.* The descending portion of the intestine, the urachus, and bladder.

Fig. 3. An ovum about six weeks old, without the decidua or amnios, but showing the chorion, the embryo, and the cord.

- a a a.* The chorion.
- b.* The urachus, or filament, which extends from the pelvis, some say from the bladder, to the superior part of the umbilical cord.
- c.* The umbilical arteries.
- d.* The umbilical vein.
- e f.* The omphalo-mesenteric vessels, or vitelline tubes, which were most beautifully dissected by the late Mr. Millar, as many other obstetric lecturers as well as myself can attest.—(See page 131).
- g.* The intestinal mass contained in the cord.

I have copied figures 2 and 3 from M. Velpeau's *Ovologie Humaine*, in which the reader will find much information.

PLATE VII.

Fig. 1. The placental circulation.—(See page 131, and plates 6, 7, and 8).

- a a.* The chorion.
- c c.* The uterine or maternal surface of the placenta.—(See plates 19, 20). The ramifications of the umbilical vein, on the foetal or internal surface of the placenta, are beautifully shown in the drawing, and enter the amnios, which is also well delineated at a certain point, to form the umbilical vein which conveys the blood from the placenta to the foetus.—(See pages 131, 132, and also plates 19, 20). The circulation of the placenta is explained in pages 133, 134.

PLATE VIII.

Fig. 1. The circulation of the foetus; the entire foetus with its appendages, the placenta, membranes and navel cord, the

front of the chest and abdomen, being removed to show the organs of the circulation.

- a a a.* The placenta.
- b b.* The umbilical vein.
- c c.* The umbilical arteries.
- d.* The bladder, prolonged towards the cord.
- e.* A portion of the umbilical cord, which opens into the vena porta, *f.*
- g.* The canalis venosus.
- h h.* The inferior cava.
- i i.* The hepatic veins.
- j.* The right auricle.
- k.* The vena cava superior.
- l.* The right subclavian vein.
- m m.* The internal jugular veins.
- n.* The left subclavian veins.
- o.* Filaments of the eighth pair of nerves.
- p.* The right ventricle.
- q.* The left ventricle.
- s.* The pulmonary artery.
- t.* The aorta.
- u.* The thymus gland.
- v.* The coronary vessels.
- w.* The phrenic or diaphragmatic nerve on each side.

For a full account of the circulation of the human foetus, see pages 137 to 149.

PLATE IX.—DEVELOPMENT OF THE GRAVID UTERUS.

Fig. 1. Shows a front view of the mammae, nipples, and abdomen, at the third month of pregnancy.

It is often extremely difficult to detect pregnancy at this early period.—(Peruse from page 147 to 163).

Fig. 2. A front view of the same parts at the sixth month of pregnancy. The increased development of the breasts and nipples, as well as that of the abdomen below the umbilicus, or navel, in which the enlarged womb may be often distinctly felt, on a line with the umbilicus, or about an inch below it.

Fig. 3. A front view of the enlarged breasts, nipples, and abdomen at the end of pregnancy, the upper part of the gravid uterus is situated in the epigastrium, or near the pit of the stomach, and the abdominal viscera are pressed against the spine. The relative situation of all these parts is beautifully shown in plate 12.

PLATE X.

Fig. 1. A lateral view of the mammae, nipples, and abdomen, at the third month of pregnancy.

Fig. 2. A lateral view of these parts at the sixth month.

Fig. 3. A lateral view of all these parts at the ninth month of pregnancy.—(See references in plate 9, fig. 1).

PLATE XI.—ILLUSTRATIONS OF THE OS AND CERVIX UTERI, OR MOUTH AND ORIFICE OF THE WOMB, IN THE VIRGIN STATE, IN THE GRAVID STATE, AND IN THE UNIMPREGNATED STATE.

It is important to remember that the respective sizes of these parts, under the circumstances mentioned, vary most considerably, according to the development of the individual.

Fig. 1. The orifice and neck of the womb in the virgin state.

Fig. 2. The same parts at the third month of a first pregnancy.

Fig. 3. The same parts at the sixth month of the first pregnancy.

Fig. 4. The same at the ninth month of the first pregnancy.

Fig. 5. The neck of the womb in the unimpregnated state, the woman having had children.

Fig. 6. The neck of the womb at the ninth month of pregnancy, the woman having had children.

For a full explanation see text, from page 147 to 163; see also calendar for the detection of the commencement, middle period, and end of pregnancy, at the end of this work.

PLATE XII.—THE WOMAN AT THE END OF PREGNANCY.

- a.* The fœtus.
- b.* A section of the mons veneris.
- c.* A section of the pubes.
- d.* The bladder.
- e.* The vesico vaginal septum.
- f.* The vagina.
- g.* The recto-vaginal septum.
- h.* The rectum.
- i.* The sacrum.
- j.* The sacro-coccygial joint.
- k.* A section of the anterior perineum.
- l.* A section of the posterior perineum.
- m.* The cul de sac, or space between the rectum and uterus.

n n. A section of the os and cervix uteri, showing the situation of these parts when undisturbed, before the commencement of parturition.

It must be obvious, that if the head of the infant is forced violently, and especially in a wrong direction, the pressure made on the bladder, rectum, and other soft parts, above described, unless timely relieved by operation, must cause congestion, inflammation, and sloughing of these parts, and produce most loathsome diseases.—(See vesico-vaginal and recto-vaginal fistulæ, page 303).

PLATE XIII.

Fig. 1. This shows the natural position of the womb, vagina, bladder, and rectum, immediately before the commencement of labour.—(See plate 12).

Fig. 2. Shows the dilatation, or opening of the os uteri, in the beginning of labour, and the mode of instituting a vaginal examination with the fingers.—(See pages 161, 171).

Fig. 3. The orifice of the womb more fully dilated.

Fig. 4. The collection of the water more fully dilating the uterine orifice, and its ultimate effusion, popularly termed “the breaking of the waters.”—(See pages 176, 177).

When the water escapes, the womb contracts tightly upon the infant, and forces it down into the cavity of the pelvis.

PLATE XIV.

Fig. 1. The natural position of the infant's head in relation to the pelvis, after the escape of the water.—(See page 180).

Fig. 2. The further descent of the head into the cavity of the pelvis; the long diameter of the head being to the short, or bis-ischiatric of the pelvis—(see plates 1 and 2); but this is gradually rectified by the contractions of the womb, or labour pains, which turn the occiput, or back of the head, to the pubis, and the face into the hollow of the sacrum, thus adapting the long diameter of the head to the long diameter of the pelvis.—(See fig. 3, pages 25, 26, and 27, and plate 2, fig. 1, plate 16, fig. 1).

PLATE XV.

Fig. 1. This shows the manner in which the external genital fissure, the anterior perineum, and anus are stretched by the head of the fœtus when it is passing externally; this stretching is often so severe in first and future pregnancies, especially where the head is disproportionately large as regards the pelvis, that the whole of these parts may be more or less lacerated, and sometimes completely torn to the verge of the anus. In order to prevent these evils it has long been determined by experienced obstetricians, to support these parts in the manner represented in the next figure.

Fig. 2. The palm of the operator's hand is pressed against the perineum and external soft parts, so that the head may be prevented from descending too rapidly, until the vagina and external genital fissure become gradually and sufficiently dilated to allow of its passage or delivery.

The reader will find a very minute account of the practical cautions necessary at this period of parturition in pages 180 and 181.

This figure represents the woman as reclining on her back, which is the position now generally preferred in most parts of Europe and America.—(See page 171).

Fig. 3. Represents the woman placed on her left side, or the British obstetric position,

the operator's naked hand being across the perineum, directing the head towards the maternal abdomen, which is the natural course of its exit.—(See plate 2, fig. 1, and page 171).

PLATE XVI.

Fig. 1. In this I have shown the student and young practitioner, the position of the head at the commencement of natural labour, its descent into the pelvis, the adaptation of the face to the sacrum, and the occiput to the pubis, and the ascent of the head towards the maternal abdomen,—(see plate 2, fig. 1), and its final expulsion, the forehead being turned towards either inferior extremity of the mother.

Fig. 2. This shows the relative position of the shoulders to the external genital fissure when passing through it.—(See page 23). One shoulder is turned to the pubis and the other to the perineum, that is, the widest part of the infant is adapted to the widest part of the outlet of the pelvis. The practitioner inclines the head towards the maternal abdomen, that is, in the curved line from below upwards, in which the head passes in natural labour.—(See plate 2, fig. 1; see also page 182).

PLATE XVII.

Fig. 1. Shows the expulsion of the head, shoulders, and loins, as well as the adaptation of the hips to the external genital fissure. All these parts are adapted with mathematical precision to the long diameter of the brim of the pelvis on either side, and rotated like the head, so that one hip is turned to the abdomen, and the other to the perineum.—(See page 26).

Fig. 2. As soon as the hips are fairly expelled, the practitioner raises the head and shoulders of the infant towards the abdomen of the mother, so as to extract the thighs, legs, and feet of the infant on the curved line already mentioned, so that the body is absolutely brought in contact with the abdomen of the mother.—(See also plate 25).

Fig. 3. This represents the birth of the infant, with the application of two ligatures to the navel cord, which is divided between them with a pair of scissors, and dressed in the manner mentioned in page 183.

PLATE XVIII.

Fig. 1. The method of examining whether the placenta is separated or not.—(See page 184).

Fig. 2. The method of removing the placenta from the vagina.—(See page 184).

Fig. 3. Hour-glass contraction of the uterus, in which it is necessary to pass the hand, to remove the placenta.—(See page 288).

PLATE XIX.

Fig. 1. The maternal surface of the placenta.—(See page 131, plates 6, 7, 8).

Fig. 2. The foetal surface of the placenta.

Fig. 3. The navel cord torn from the placenta.

PLATE XX.

Fig. 1. Double and distinct placentæ of twins, each having separate appendages.

Fig. 2. Shows twins between the eighth and tenth weeks of age, with their separate appendages.

PLATE XXI.

Fig. 1. The face turned to the pubis, and the occiput to the sacrum.

This is a much more difficult presentation than the natural one, as the chin or occiput must be extracted first, some say the one, some say the other, but in either case, the diameter of the head is very much longer than in natural labour.—(See plate 15, figs. 1, 2; also plate 16, fig. 1, and page 207).

Fig. 2. A transverse presentation, in which the arm presents; this requires the operation of version or turning.—(See page 218).

Fig. 3. Mode of performing the operation.—(See page 221).

PLATE XXII.

Fig. 1. Shows the frequent position of twins in the womb at the commencement of parturition, with the umbilical cord twisted round the neck and body.

It often happens that both are born by the head, or one by the head and the other by the feet.

Cases have also occurred, in which the two heads presented simultaneously, as also the four lower extremities, yet both infants were born alive in either position. It is also on record, that the lower extremities and body of one infant were expelled to the neck, while its head and that of the other foetus were impacted in the pelvis. The first infant was born alive, the other dead.—(See page 223).

Fig. 2. Presentation of the face at the outlet of the pelvis, the forehead being in the concavity of the sacrum, and the chin approaching to the pubis.

Fig. 3. The same presentation expelled lower down.—(See pages 232, 246, &c.)

PLATE XXIII.

Fig. 1. In plate 21, fig. 3, the practitioner introduces his hand into the womb to grasp one or both feet, as in the operation of turning,—(see pages 211, 212, and 213), which he extracts obliquely from sacrum to pubis.—(See page 214). During this manœuvre, one of the infant's hips s

turned into the oblique or long diameter of the brim of the pelvis, thus the largest part of the pelvis of the infant is towards that of the mother.

A rotatory motion is now effected, as during the descent of the infantile head, one hip being turned to the sacrum and the other to the pubis, as accurately described in fig. 2.

As soon as the hips have arrived at the external genital aperture, the lower one, next the perineum or back of the woman, is to be raised with the hand, and properly supported.—(See plate 17, figs. 1, 2, and page 214).

Fig. 3. So soon as the hips have fairly passed the external genital fissure, it has long been advised to turn the abdomen of the infant to the back of the mother, but it must be evident from what has been already stated, that this is not adapting the largest part of the infant to the largest of the mother. In my opinion, it would be much more correct to advise the body of the infant to be brought down obliquely, as in figs. 1 and 2, until the axillæ or hollow spaces under the arms are brought into the transverse diameter of the brim, or into the sacro-pubic of the outlet; and I feel convinced, that the arms, in this position, could be more easily extracted than by the method about to be described.

PLATE XXIV.

Fig. 1. Shows the pelvis and lower extremities of the infant directed towards the maternal abdomen, as advised in most modern obstetric works.

Fig. 2. This presents the extraction of the body of the infant to the neck, the practitioner being in the act of extracting the right arm.—(See page 214).

Fig. 3. The practitioner extracting the left arm.

PLATE XXV.

Fig. 1. When the arms and body of the infant are extracted, the neck rapidly descends, in most cases, to the outlet; the fore-finger of the left hand is placed in the infant's mouth, to depress the chin on the chest, and its body is supported upon the same arm, two fingers of the other hand being placed on the sides of the neck, so that the traction is made towards the abdomen of the mother, and the chin, face, forehead, crown, and back of the head are extracted in rapid succession, while the back of the infant is brought in contact with the abdomen of the mother.

Fig. 2. Shews the gradual extraction of the chin, base of the skull, face, and part of the forehead.

Fig. 3. Represents spontaneous version, or evolution.—(See pages 224, 208, and

211); but this is never trusted to at present.

Fig. 4. Represents the descent of the feet, which are to be drawn downwards, and adapted to the pelvis, as in plates 23, 24, and 25.

PLATE XXVI.

Fig. 1. The arm and leg presenting.

The practice in this case is to draw down the leg or legs and body, as in the case just quoted.

Fig. 2. The practitioner drawing down the leg and pushing up the arm, as in cases of arm presentation.—(See plate 22, figs. 2 and 3).

Fig. 3. Presentations of the knees are to be managed in the same manner.

Fig. 4. Shews a breech presentation, the back of the infant being to the abdomen of the mother.

All these are to be managed, as well as the six that follow, by the operation of version or turning, as described in pages 28, 211, and 218.

PLATE XXVII.

Fig. 1. The back of the infant the presenting part.

Fig. 2. The right side of the infant the presenting part.

Fig. 3. The loins the presenting part.—(See page 209).

These are to be relieved by version or turning.

PLATE XXVIII.

Fig. 1. The left side of the foetus the presenting part.

Fig. 2. The abdomen of the foetus the presenting part.

Fig. 3. the thorax the presenting part.

In these, and all other transverse or cross births, as a general proposition it may be laid down, that the operation of nature is insufficient for delivery, and that version or turning, as well as other operations hereafter described, may be necessary.

PLATE XXIX.

Fig. 1. Shows the navel-cord surrounding the infant's head, and also partially presenting.—(See plate 8, fig. 1; pages 136 and 211.)

Fig. 2. Presentation of the face.—(See page 209.)

Fig. 3. Presentation of the ear.—(See same page.)

PLATE XXX.—APPLICATION OF THE FORCEPS, LEVER, &c.—(See page 225).

Fig. 1. Application of one blade of the forceps.

Fig. 2. The same regularly applied.

Fig. 3. The other blade applied.

PLATE XXXI.

Fig. 1. Both blades or sides locked or jointed.

Fig. 2. Shows that traction must be made on the curved line towards the abdomen of the mother.—(See from page 224 to 326).

Fig. 3. A breech presentation, beyond the reach of the fingers.

Fig. 4. Descent of the same, so that the fingers may be brought into the groin, and the infantile pelvis in some measure adapted to the proper diameters of the maternal.

PLATE XXXII.

Fig. 1. The head separated from the body at the brim of the pelvis, the chin resting on the pubis, the occiput placed upon the promontory of the sacrum, and a forceps applied at each side of the face, so that the long diameter of the head may be readily turned into those of the brim, cavity, and outlet of the pelvis.—(See plate 16, fig. 1).

In some cases it may be necessary to reduce the bulk of the head by perforation, and the craniotomy forceps.

Fig. 2. The long diameter of the head forced through the short diameter of the brim of the pelvis. Foreign obstetricians apply a forceps in this case, but this inflicts so much pressure on the bladder and the rectum, as to be followed by vesico-vaginal and recto-vaginal fistulæ.—(See pages 286, 303, 304, 305, 306; see also plate 12.)

PLATE XXXIII.

Fig. 1. The vectis or lever applied to the forehead.

Fig. 2. The same applied to the back of the head.

Fig. 3. The same applied to the hip.

For an account of other instruments, as the blunt-hook, see pages 237, 238, and 239; fillets or bands, 239, and also plates 39 and 40.

PLATE XXXIV.—EMBRYOTOMY—EMBRYULCIA—CRANIOTOMY.

Fig. 1. Introduction of the scissors or perforator along the index and middle finger of the left hand.

Fig. 2. The instrument opened when introduced to the shoulders or rests, as they are termed.—(See plate 39, fig. 5).

The mode of performing this formidable and dangerous operation is minutely described in the text from page 246 to page 251.

Figs. 3, 4, 5, 6, 7, and 8 represent different degrees of contraction or deformity of the pelvis, while the last shews its great increase of size.

PLATE XXXV.

Fig. 1. Shows the reduction of the head with the craniotomy forceps.

Fig. 2. The same operation, except that

the scalp is left entire to cover the spiculæ of bone which would otherwise perforate, lacerate, and inflame the vagina.—(See page 247).

Fig. 3. The whole cranium removed.—(See pages 239, 249).

This plate also shows the trunk remaining in the uterus after craniotomy, and this disease is named *décollement* by the French. For an account of the management of this case see page 251.

PLATE XXXVI.

Fig. 1. Induction of premature labour in cases of female deformity, in which a full-grown infant cannot possibly be born alive at the end of pregnancy; and, be it remembered, that the operation is performed to save the lives of the mother and offspring. For a minute account of this operation, see page 240.

I must take leave to add in this place, that no medical practitioner of whatever age, respectability, talent, or experience, can perform this operation, when he uses instruments, unless these be guided to the uterine orifice by one or two fingers of the left or right hand. The passage of any kind of instrument at random, and without being so guided, into the vagina of a woman, either while in the erect, recumbent, or any other posture of the body, could not be safely or properly introduced into the uterine orifice by the most dexterous physician, surgeon, or obstetrician in existence.

Neither is it necessary to use different instruments at different times, when an educated physician or surgeon is concerned, as one application will be sufficient to effect the object in view. I enter into these particulars, because the above evidence saved a most respectable and innocent surgeon from being convicted of felony, he having been accused of having used different instruments at different times to effect his criminal object. The prosecutrix was, however, delivered of a living infant in due time, and it was in good health at the time of the trial in August 1840.

Fig. 2. The incisions for gastro-hysterotomy, or the Cæsarean operation.—(See from page 264 to 280.)

Fig. 3. The extraction of the foetus through the wound in the abdomen.—(See page 275, as also 276, for the treatment after the operation.)

PLATE XXXVII.

Fig. 1. Placental presentation at the right side of the uterus.

Fig. 2. The same presentation at the left side.

Fig. 3. The direct implantation of the placenta over the uterine orifice, which is usually followed by most profuse and fatal hæmorrhage, unless life be preserved by

transfusion. For an account of the management of these cases, which are amongst the most fatal of every day occurrence, see pages 312, 313, and 314.

PLATE XXXVIII.

Fig. 1. Shews a presentation of the neck, which could not be rectified by any operation, except decapitation of the foetus. When this is performed, the upper extremity is to be seized by the operator, and the body and lower extremities will be easily extracted; the head may be readily removed with the hand or forceps, but sometimes requires to be reduced in size by craniotomy.

Fig. 2. The sternum or breast-bone is the presenting part, and neither feet nor head can be brought down, in consequence of the violent action of the uterus, which sometimes cannot be controlled.

Fig. 3. Shews the perforation of the chest, and the evisceration of this cavity, as well as that of the abdomen.

Fig. 4. A crotchet applied to the spine to divide the body into two halves, each of

which can be readily extracted with the hand after the operation.

PLATE XXXIX.—OBSTETRIC INSTRUMENTS.

Fig. 1. The forceps, or artificial hands.

Fig. 2. One side of the forceps.

Fig. 3. The lever.

Fig. 4. The blunt-hook.

Fig. 5. The perforator, or scissors.

Fig. 6. The craniotomy forceps.

PLATE XL.

Fig. 7. The sharp crotchet.

Fig. 8. The stylet.

Fig. 9. The interior of this instrument.

Fig. 10. A female catheter.

Fig. 11. A tracheal pipe.

Fig. 12. A curved blunt-hook, for removing pieces of the placenta and membranes from the uterine orifice, in cases of early abortions.

Fig. 13. A forceps exclusively used for the same purpose.

Internal Organs of Generation, 48
 Intertrigo, or Chafing, 509
 Intestinal Irritation, 332
 Intestine, Spasm of, 433
 Intussusception of Infants, 508
 Intro-pelvimeter, 37
 Instruments, Obstetric, 224
 Forceps, description of, 225
 Remarks on the use of, 225, 228
 Position of the Woman, during the use of, 228
 Rules for the Application of, 229
 in Occipito-anterior Position of the Head, 230
 Method of making Traction, 231
 in Occipito-posterior Position, 232
 in Occipito-ischiatic, 233
 in Fronto-ischiatic, 233
 same Presentations at the Brim, 233
 Body born, Head in Utero, 236
 Positions at the Outlet, 236
 Intellect, Infantile, development of, 460
 Intermittent Fever of Childbed Women, 328
 Invagination, Intestinal, 508
 Inversion of the Womb, 383
 Inward Fits, 511
 Irritants in Cases of Infants, 469
 Irritation, Constitutional, after severe loss of Blood, 335
 Ischium Os, 14
 Ischuria, 438

J.

Jaundice, Infantile, 511
 of Women, 435
 Joints of Infants, Diseases of, 521

K.

Knees, Labour by, 30
 Knee bent, Cure of, 495
 Knee-joint, Diseases of, 495
 White Swelling of, Cure of, 522

L.

Labia, Absence of, 357
 Abscess of, 320
 Cancer of, 354
 Cohesion of, 356
 Cysts in, 355
 Enlarged Veins of, 320, 355
 Erysipelas of, 353
 External, Inflammation of, 320
 Laceration of, 301
 Fibrous Tumours of, 335
 Œdema of, 354
 Minora, 43
 Sloughing, 353
 Varices of, 49, 355
 Wounds of, 356
 Labour, Natural, Mechanism of, 25
 Causes of, 166
 Management of, 168, 186
 Attended with Hæmorrhage, 306
 By the Breech of the Infant, 30
 By the Knees, 30
 By the Feet, 28
 Complicated, with Hæmorrhage from different Organs, 317
 Premature, Induction of, 240
 Preternatural, 205
 Difficult, Definition of, 205
 Caused by Rigidity of the Genitals, 205
 Disproportion between the Head and the Pelvis, 205
 Premature Rupture of the Membrane, 206
 Rigidity of the Membrane, 206
 Inordinate Distention of the Uterus, 206
 Hydramnios, 206
 Dropsy of the Amnios, 206
 Redundancy of the Water, 206
 False Water, 206

Labour, with slight or irregular Action of the Uterus, 206
 Delicacy of Constitution, 206
 Mental Depression, 207
 Partial and Spasmodic Contractions of the Uterus, 207
 Prefernatural Positions of the Fœtus, 207
 Lactation, Artificial, 198
 Hygiene, relative to, 189
 Maternal, 189
 Mercenary, 197
 Laryngismus Stridulus, 519
 Leg, Cramp of, in Labour, 180
 Cause of, 180
 Treatment of, 180
 Puerperal Swelled, 333
 Varicose Veins of, 300
 Lepra, 509
 Leucorrhœa, 347
 Infantile, 513
 Lever, use of, 236
 Lichen, 509
 Lienteria, 508
 Life of the Mother or the Infant, which is to be preserved, 240, 242, 254, 256, 261
 Turn of, 72
 Transmission of, 78
 Ligaments of Uterus, 54
 Broad, 54
 Round, 54
 Uterine, Inflammation of, after Delivery, 330
 of the Uterus, Diseases of, 421
 Light in Infantile Chamber by Night, bad Effect of, 200
 Lingua Ligata, 488
 Liquor Amnii, Redundancy of, 266
 Literature, Early Pursuits of, Injurious to Children, 204, 460
 Liver of Fœtus, Peculiarities of, 137
 Liver, Partial Protrusion of at the Navel, 504
 Lochia, or Child-bed Discharge, 326
 Absence of, 327
 Derangements of, 327
 Locking of the Head, 234
 Locomotive Organs, Diseases of, 510
 Longings, Effects of on Fœtus, 115
 Loose Dress of Infants, 192
 Lungs, Inflation of, 194

M.

Madness, Puerperal, 334
 Magnetism, the Cause of Sterility, 76
 Malacia, 431
 Malacosteon Affecting Pelvis, 36
 Males, Infecundity of, 90
 Malformations of the Pelvis, 36
 Management of New-born Infants, 190
 Children, 460
 Women after Delivery, 194
 Mammæ, State of, after Conception, 157
 Diseases of, 422
 Inflammation of, 423
 of Infants, 191
 Mania during Labour, 322
 Puerperal, 334
 Marasmus of Infants, 523
 Marks on Infants, 115
 Mastodynia, 424
 Maternal Imagination, Effects of, 115
 Nursing, 189
 Measles, 509
 Meatus Urinarius, 43
 Diseases of, 358
 Measurements of Infant's Head, 21
 Meconium, Retention of, 510
 Medicine of Infants, 466
 Medicine, Obstetric, 1
 its Extent, 2
 Medical Obstetrician, 3
 Medicines, Use of, in Early Life, 468
 Membranes, Formation of, 116, 126
 Membrana Decidua, 129
 Protrusion of, 177
 Rigidity of, 178
 Membrane, Rupture of, in Labour, 177
 when to be Ruptured by Art, 178
 Men of Genius the first-born of their Family, 88

Men who over-exert their Mental Faculties often Engender Pusillanimous and Idiotic Infants, 88
 Menopausis, 346
 Menopause, 346
 Menorrhœa, 345
 Menorrhagia, 345
 Menostasis, 341
 Menses, Absence of, 340
 Disorders of, 64, 69, 337
 Establishment of, 63
 Cessation of, 71
 Physiology of, 59, 75
 Excessive, 345
 Retention of, from Obstruction of the Genitals, 341
 Suppression of, 344
 Difficult, 342
 New Remedy for, 69
 Vicarious, 65
 Mental Education, 462
 Mercury in Infantile Cases, 470
 Mercenary Lactation, 197
 Mesenteric Glands, Diseases of, 523
 Metritis, or Uterine Inflammation, 329
 Metromania, 405
 Miliary Fever, 323
 Milk, Absence of, 424
 Defect of, 424
 Different States of, 423
 Fever, 327
 Involuntary Discharge of, 424
 Leg, Child-bed, 333
 Retention of, 424
 Substitute for, 198
 Superabundance of, 423
 Mind, Influence of, on Fœtus, 115
 Miscarriage, Account of, 306
 Moles, 399
 Mollites Ossium, 36
 Monstrosities from Excess of Development, 477
 Twins, Union of, 477
 1. Synadelphia, 477
 2. Omeadelphia, 477
 3. Heteradelphia, 477, 483
 4. Enedadelphia, 477, 483
 Siamese Twins, 478
 Similar Cases, 480, 482
 from Defect of Development, 484
 Contractions of Parts, 485
 Absence of Anterior Parietes of the Thorax, 491
 the same Part of the Abdomen, 491
 Mons Veneris, 41
 Moral Management of Children, 204, 260
 Moral Education, 468
 Mortality of Infants, 467, 525
 Children Immense, 205, 521
 Females not Greater at the Turn of Life than at the same Age in the other Sex, 72
 Mother after Delivery, Management of, 185, 194
 Regimen for, 195
 Mother's Marks, 492
 Motion of Coccyx, 19
 Excessive, of Fœtus, 447
 Absence of, 159
 Mouth, Congenital Contraction of, 488
 Muguet, 513
 Muscular Fibres of Uterus during Gestation, 154
 Muscles, *psœ*, Rupture of, during Labour, 322
 Mustard Poultices to Infants, 469
 Fomentations, 469

N.

Nævus Maternus, 506
 Nails, congenital Diseases of, 505
 Narcotics in Infantile Diseases, 473
 Natural Labour, 166
 Natural Parturition, 166
 by the Abdominal Extremity of the Fœtus, 28
 Nausea, 430
 Navel, Prominence of in Pregnancy, 155
 Navel-cord, excessive Length of, 319
 Incision of, 183
 Ligature of, 183
 Rupture of, 319

Navel-string, Account of, 156
 Neck, Scrofula of, 522
 Necometer, Use of, 37
 Nettle-rash, 509
 Neuralgia in different Parts of the Body, 452, 454
 Neuritis Peuperal, 333
 New Nomenclature, 2
 Nine-day Fits, 518
 Nipples, Ulcerations, of, 423
 Fissures of, 423, 425
 Vices of Conformation of, 424
 Nose, Bleeding from, in Infants, 520
 Nosography, Infantile, 466
 Nosology, Infantile, 466
 Nostrils, Congenital Contraction of, 486
 Nursery Lamps should be as dim as possible, 200
 Nurses, Choice of, 197
 Management of, 197
 Hints to, 201
 Nursing, Maternal, 195
 Obstacles to, 195
 Nymphæ, 43
 Cohesion of, 357
 Diseases of, 357
 excessive Length of, 357
 Fungous Tumours of, 357
 Inflammation of, 357
 Nymphomania, 405

O.

Obliquities of Uterus impede Labour, 295
 Obstetricy, adoption of Term, 3
 Obstetric Case of Instruments, 168
 Division of the Pelvis, 166
 Medicine, 1
 its Extent, 1
 Operations, Intentions of, 224
 Instruments, 224
 Obstetrician, Male, superiority of, 167
 Medical, 3
 Odontalgia, 443
 Species of, 443
 Œdema during Gestation, 299
 of lower Limbs, 299
 Offspring unlike either Parent, 87
 Ophthalmia of new-born Infants, 512
 Purulent, 512
 Ordinary and extended Periods of Pregnancy, 152, 163
 Organic Bodies, 80
 Organized living Matter, Creation of, 78
 Organs of Generation, 41
 preternatural Adhesion of, 488
 preternatural Divisions of, 489
 Orthopædic, British and Foreign, Institutions, 496
 Ossa Coxalia, 13
 Osteology of the Pelvis, 9—14
 Os Uteri, Changes of in Pregnancy, 154
 Excrescences, 372
 Phagedena, 372
 Ulceration of, 372
 Outlet of Pelvis, 17
 Ova, 52
 Ovaria, Anatomy of, 52
 Ovarian Dropsy, 410
 Ovaries, Diseases of, 408
 Hernia of, 418, 419
 Inflammation of, after Delivery, 330
 Inflammation of, 409
 Scirrhus of, 417
 Ovaritis, 409
 Ovary, Atrophy of, 410
 Cancer of, 417
 Dropsy of, 410
 Encysted Tumours of, 410
 Hypertrophy of, 410
 Organic Disease of, 417
 Tapping of, per Vaginam, 415
 Ovology, Human, 116, 126
 Ovonosology, 475
 Ovum, or Germ, round like the World, 79
 Ovule, Definition of, 117
 when visible after Conception, 117
 Ovulum, Definition of, 117
 .. Description of, 120

P.

Pædonosology, 475
 Pædonosography, 466

- Pains, False, 173**
 in Muscles, 454
Palate, Cleft, 489
Palpitation of the Heart, 446
Panophobia, 520
Paralysis, Partial, of one or both Lower Extre-
 mities, 334, 454
 after Delivery, 334
Parthenosology, 2
Parts, Deviations of, at Birth, 493
 Defects of, Congenital, 493
Parturition, Natural, 166
 Hygiene relative to, 186
 Natural by the Head, 25
 Adaptation of the Infantile Shoulders
 and Pelvis to the Mother, 26
 Natural, by the Abdominal Extre-
 mity of the Fœtus, 28
Paternity, Charges of, and of Female Violation,
 against very aged Men, 152
Pelvimeters, use of, 37
Pelvis, Anatomy of, 15
 Articulations of, 17
 Axes of, 17
 Union of, 20
 Brim of, 17
 Cavity of, 18
 Contractions of, 19, 40
 Diameters of, 16
 Deformities of, 35
 Causes of, 35
 Female, Varieties of, 34
 Inclinations of, 17
 Joints of, Relaxation of, 454
 Ligaments of, 15
 Osteology of, 9, 16
 Planes of, 16
 Malformations of, 36
 Obstetric Divisions of, 16
 Outlet of, 19
 Relative to Ages, Sexes, and Species, 33
 Tumours in, impeding Labour, 289
 Width of Infantile, 24
Pemphigus, 109
Penis, Imperforate, 487
Perineum Anterior, 46
 Posterior, 46
 Laceration of, 301
 Support of, 181
Peripneumonia, 515
Peritonitis, Infantile, 514
 Puerperal, 332
Pertussis, 516
Pessaries, use of, 378
Phlebitis, Crural, 333
 Uterine, 329
Phlegmasia Dolens, 333
Phthisis, 429
Physical Education of Infants, 460
 Authors, new Arrangement of, 460
 Power, the Effects of, on Offspring, 469
 Management of Infants, 190
Physometra, 391
Pica, 431
Pigeon-breast, 524
Piles, 433
Pityriasis, 509
Placenta, Absorption of, 320
 Adhesion of, 314
 Development of, 131
 Diseases of, 133
 Examination for, 184
 Extraction of, 288
 Removal of, 184
 Double, in Cases of Twins, 286
 Physiology of, 131
 Circulation of, 133
 Presentations, Dilatations of the Uterus
 in, 291
Plants and Animals, Classification of, 84
 Formed from an Ovum, *omnia ex ovo*, 79
 Generation of, 92
 Anatomy of, 93
 Reproduction of, 94
Plates, Explanation of, 531
Pleurisy of Infants, 514
 Women, 429
Pleuro-Pneumonia, Infantile, 514
Pleurodynia, 453
Pleurospadias, 489
Plethora during Pregnancy, 445
Plurality of Infants, extraordinary, at one
 Birth, 116
Pneumatosis Uterina, 391
Pocket Obstetric Case, 168
Polygala, 423
Polygalacty, 423
Polypus Vaginæ, 394
 Uteri, 394
Pompholyx, 509
Porriço, 509
Posture, Erect, danger of, after Delivery, 185
Position of Fœtus in Utero, 25, 129
Power, Physical, its Effects on Offspring, 86
Pregnancy, Diseases resembling, 151
 Duration of, 163
 Extra-uterine, 292
 Influence of, on Diseases, 455
 Nervous, 498
 Prominence of Navel in, 154
 Ovarian, 411
 Signs of, 150
 a most important Enquiry in private
 and public Practice, 150
Pregnant Women, Diseases of, 427
Prepuce, Congenital Contraction of, 483
 Prolongation of, 493
Presentation, Infantile, Definition of, 25
Preternatural Labour, 166, 205
Procidencia Uteri, 377
 during Pregnancy, 381
Prolapsus Recti, 504, 512
 Uteri, 374
 Vaginæ, 360
 Vesicæ, 361
Prurigo, 509
Pruritus, 353
Psoriasis, 509
Ptyalism, of Infants, 470
 Women, 433
Pubic Joint, Abscess of, 33
Puberty, Female, 59
 Diseases of, 337
Pudendal Hernia, 301
Pudendum, 42
Pudoris Sinus, 42
Puerperal Convulsions, 335
 Cruritis, 333
 Diseases, 326
 Inflammations, 327
 Malignant Fever, 330
 Mania, 334
 Neuritis, 333
 Peritonitis, 332
 State, Hygiene relative to, 187
Pupils, occlusion of, 488
Purpura, 509
Purulent Discharges of Infants, 353
 Ophthalmia, 512
Pyrosis, 433

Q.

Quickening, 157, 159, 160, 527
Quinsy, 515

R.

Rachialgia, 453
Rachitis, 523
Rashes of Infants, 509
Re-action, violent, after severe Loss of Blood, 335
 Diagnosis and Treatment of
 335, 336
Rectum, Absence of, Operation for, 493
 Congenital Contraction of, 487
 Sloughing of, 301
 opening into Vagina, 286
Recto-Vaginal Septum, Rupture of, 301
 Sloughing of, 301
Reproduction, Physiology of, 75
Respiration—Crowing of Infants, 519
 of Infants, Diseases of, 509
 of Women, Diseases of, 429
Retroflexion of Uterus, 294
Retroversion of Uterus, 294
Retention of the Menses, 340
 Urine of Women, 433
 Children, 188
Reviews of this Work, 2—5
Rickets, 523

Rigidity of the Genitals, 205
 Risus Sardonius, 520
 Rocking, violent, injurious to Infants, 193
 Roseola, 509
 Rubeola, 509
 sine Catarrho, 509
 Nigra, 509
 Rules for Nursing, 189
 for Prescribing, 463
 Rupture, see Hernia, 542
 of Infants, 503
 Muscles during Labour, 322
 Sternum during Labour, 322
 Premature, of Membrane, bad Effects
 of, 206
 when required, 206
 of the Uterus, 289

S.

Sacro-Coccygeal Joint, Abscess of, 334
 Sacro-Iliac Joints, Pains in, 455
 Painful State of, 334
 Sacrum, Definition of, 10
 Shallowness of, 39
 Salivation, 433
 Scabies, 509
 Scaly Tetters, 509
 Scalds, 509
 Scalp, Tumefaction of, 507
 Scarlatina, 509
 Schools, Defects and Merits of, 464
 Scrofula of the Hip-Joint, 522
 Knee-Joint, 522
 Mesenteric Glands, 523
 Neck, 522
 Screaming of Infants during Sleep, 520
 Sedative Draught, Use of after Delivery, 185
 Selection of Wet Nurses, 198
 Senses, Congenital Lesions of, 518
 Sensibility, Preternatural, of Gravid Uterus, 308
 Sex, Determination of, 90
 Shoulders, Infantine, Width of, 23
 Presentation of, 211
 and Pelvis, Infantile, Adaptation of
 to the Mother during Labour, 26, 182
 Signs of Pregnancy, 150
 Earliest and Latest Age in this Climate at
 which Pregnancy can occur, 151
 of an Infant having been born Alive, 183
 of a Woman being Delivered, 163
 Singultus of Infants, 511
 Skin, Congenital Spots on, 492
 Tumours on, 492
 Malformations of, 505
 Sleeplessness of Infants, 520
 Sloughing of the Genitals, 353, 473
 Small-Pox, Congenital, 505
 Snuffles, Malignant, 409
 Sons of Great Men unlike their Fathers, 86
 Soothing Syrups, Danger of, 473
 Spasm after Delivery, 288, 400
 of the Glottis, 509
 Intestine, 433
 Mammæ, 424
 Mouth of the Womb, 342
 Stomach, 433
 Womb, 288, 400
 Spina Bifida, 501
 Spinal Deformities, Cure of, 496
 Medulla, Diseases of, 502
 Spitting of Blood of Children, 520
 Spontaneous Evolution, 224
 Spot, Germinal, 124
 Spring the Season of Universal Generation, 83
 Spurious Water, 297
 Staphyloraphy, 489
 Sterility, 408
 Female, 71
 caused by Magnetism, 76
 Puerile, 58
 Sternum, Rupture of, during Labour, 322
 Stethoscope, 159
 Still-born Infants, 508
 Stomach, Acidities of, 431
 Spasm of, 433
 Stomatitis, Species of, 514, 515
 Stone in the Bladder, 283
 Strabismus, 493
 New Operation for, 493

Sucking-Bottle, 198
 Sudamina, 328
 Superfœtation, Account of, 165
 Suppression of Urine, 438
 Suppressio Mensium, 344
 Swine Pox, 509
 Swelling of Infants' Breasts, 191
 of the Feet during Pregnancy, 299
 Symphysis Pubis, Section of, 244
 Symphyseotomy, 244, 252
 Syncope during Pregnancy, 446
 of Infants, 508
 Syphilis during Pregnancy, 300
 of Infants, 497

T.

Tabes Mesenterica, 523
 Tape Worm, 508
 Tapping for Ovarian Dropsy, per Vaginam, 415
 Tænia, 508
 Teething, Difficult, 518
 Tenesmus, 437
 Testes Mulibres, 52
 Tetanus, Infantile, 518
 Therapeutics in Early Life, 468
 Thigh, Cramp in, during Labour, 180
 Thorax, Absence of Anterior Parietes of, 491
 Thrush, 513
 Toes, Contracted, Cure of, 495
 Supernumerary, 492
 Tongue, Prolongation of, 493
 Tongue-tied, 488
 Toothache, 443
 Species of, 443
 Author's Cure for, 443
 Tracheal Pipe, Use of, 194
 Tracheitis, 515
 Transfusion of Blood, 316
 Trismus Nascentium, 518
 Tubes, Uterine, Diseases of, 420
 Inflammation of, after Deli-
 very, 330
 Tumours in Pelvis, impeding Parturition, 280
 Tumour Perineal, 181
 Turbulent Fœtus, 447
 Turning, Remarks on, 211
 Account of the Operation, 214
 Extraction of the Feet, Legs, Hips,
 Loins, Trunk, Arms, and Head, 214—218
 Summary of Operation, 218—224
 Twins, Weight of, at Birth, 129
 Double Placenta of, 286
 Presentation of, 337
 Tympanites Uterinus, 391

U.

Umbilical Cord, 136
 Absence of Nerves in the, 136
 Average Length of the, 137
 Blood Vessels of the, 136
 Excessive Length of, 319
 Knots on the, 137
 Origin and Insertion of, 136
 Shrivelling of the, 192
 Simple Structure of the, 136
 Varicose State of the, 137
 Union of Axes of Pelvis, 20
 Union of Birds, 89
 Universe, Primitive Generation of, 78
 Urethra, Congenital Contraction of, 487
 External Orifice of, 43
 Diseases of, 358
 Urinary Calculus impeding Labour, 283
 Urine, Incontinence of, during Labour, 321, 441
 after Delivery, 321
 in Infants, 520
 Retention of, 438
 during Labour, 321
 Uterine Ligaments, Diseases of, 421
 Dropsy of, 421
 Encysted Tumours of, 421
 Neuroses of, 400
 Orifice, Contraction of, on the Neck of
 the Fœtus, 318
 Phlebitis, 330
 Treatment of, 330
 Tubes, 52
 Uteromania, 405
 Uterus, 48

Uterus, Anteversion of, 295
 Diseases of, 371
 Dilatation of in Placental Presentations, 291
 Convulsions, 291
 Gravid, Development of, 147
 Hernia of, 385
 Inflammation of, during Labour, 320
 Puerperal Inflammation of, 329
 Obliquities of, 295
 Polypus of, 394
 Retroflexion of, 294
 Retroversion of, 294
 Rupture of, 289
 Forcibly Torn away, 184
 Spontaneously Expelled, 184
 Utero-Vaginal Catarrh, 347

V.

Vaccination, Necessity of, 203
 Vagina, 54
 Absence of, 360
 Constriction of, 56
 Congenital Contraction of, 487
 Descent of the, 360
 Mucous Membrane of, 360
 Diseases of, 359
 crossed by Bands, 285
 opening into Rectum, 286
 foreign Bodies in, 362
 Inflammation of, 363
 Hernia of, during Labour, 301
 Invagination of, 360
 Inflammation of, during Labour, 320
 opening above the Pubis, safe Delivery, 286
 Prolapsus of, 360
 Rupture of, 369
 Tumours of, 370
 Spasm of, 350
 Vaginal Cystocele, 361
 Enterocele, 362
 Hysterotomy, 280
 Examination (Internal) indispensable for the Detection of Pregnancy or Labour, 159, 161
 Varices during Pregnancy, 449
 Extending to the Uterus, 449
 Varieties of Female Pelvis, 34
 Variola, 509
 Vectis, Use of, 236
 Veins, Varicose, of the lower Extremities, 300
 Vein, Umbilical, Course of, 140
 Venereal Chancres of the Vulva, 358
 Venery, Excessive, Injuries by, 91
 Vermes, 508
 Version, Artificial, see Turning, 211
 Spontaneous, 224
 Remarks on, 211
 Vesicle, Germinal, 123
 Graafian, 53, 120
 Vesico-Vaginal Fistula, 203
 Vesicula Allantoides, Account of, 131
 Umbicalis, Account of, 131
 Vestibulum, 43
 Vicarious Menstruation, 65

Vigour and Health of Parents, their Influence on Progeny, 86
 Violation of an Infant aged about Eleven Months, and Death of, 364
 Virginity, Proofs of, 44
 Disproofs of, 45
 Volition, Effects of on Generation, 87
 Vomiting of Infants, 511
 during Pregnancy, 430
 Vulva, 42
 Chancres of, 358
 Venereal Sores of, 358
 Congenital Contraction of, 487
 Erysipelas of, 353
 Prurigo of, 353
 Obliteration of, 284
 Thrombus of, 320
 Vulvo-Uterine Canal, Cohesion of, 284

W.

Want of Sleep, 451
 Ward's, Mr., new Method of performing Catheterism, 439
 Warmth necessary for young Infants, 201
 Water Brash, 433
 in the Brain, 501
 Gathering of, 177
 Spurious, 297
 Weakness, Female, 347
 Weaning, 199
 Weid, or Ephemera, 328
 Weight of Fœtus at Birth, 129
 Twins at Birth, 129
 Wet Nurses, Selection of, 197
 Whites, 347
 White Swelling of the Joints, 522
 Womb, 48, 58, 154
 Development of during Pregnancy, see Uterus, 147
 Diseases of, 371
 Falling down of, 374
 Hour-glass Contraction of, 288
 Inflammation of during Labour, 320
 Inversion of, 383
 Spasm of the Mouth of, 342
 Vices of Conformation of, 371
 Contusions of, 372
 Wounds of, 372
 Precipitation of, 374
 Prolapsus of, 374
 Relaxation of, 374
 Descent of, 374
 Externally, 381
 Pessaries, Application of, 379
 Women, Diseases of, 205, 325
 Classification of, 325
 Modern arrangement of, 326
 Treatment of at the turn of Life, 73
 Physiology of, 58
 Wrist, Contracted, Cure of, 493
 Wry Neck, 494

Y.

Yellow Jaundice of Infants, 511
 Pregnant Women, 435

